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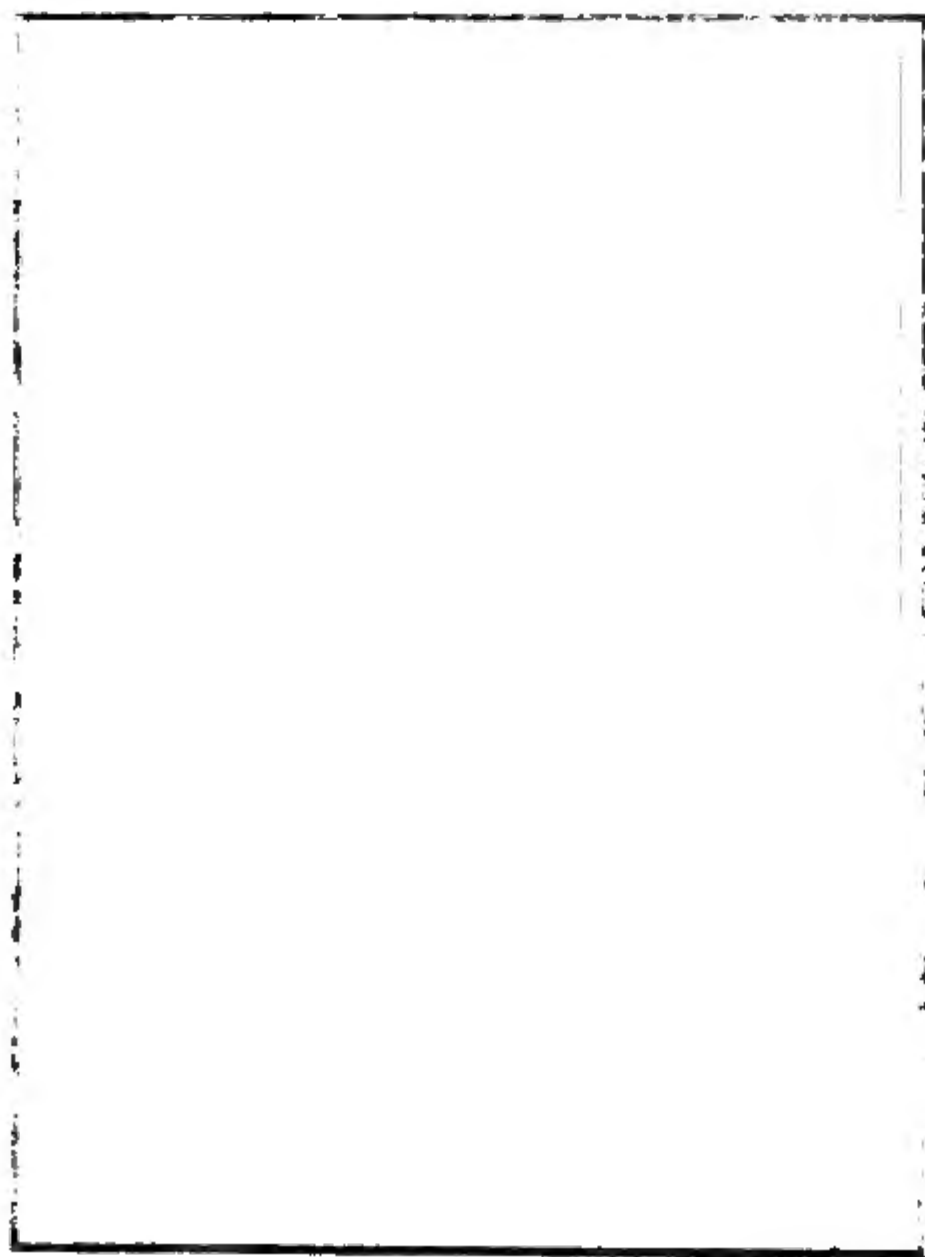
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Sir John Stowe.*

Published May 1790, at D. B. & Co. George's Street.

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ANNALS
=
OF
BOTANY.

EDITORS,
CHARLES KONIG, F.L.S.
AND
JOHN SIMS, M.D. F.L.S.

*Multum adhuc restat operis, multumque restabit, nec ulli
nato post mille sæcula præcludetur occasio aliquid adhuc
adjiciendi,*

SENECA, Epist. 64.

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Presented to

by
THE RIGHT HONOURABLE

SIR JOSEPH BANKS, BARONET, K. B.

PRESIDENT OF THE ROYAL SOCIETY, ETC. ETC. ETC.

THIS VOLUME

OF THE

ANNALS OF BOTANY

IS DEDICATED,

WITH EVERY SENTIMENT

OF GRATITUDE AND RESPECT,

BY

THE EDITORS.



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The reader is requested to correct the following errors:

- Page 129, line 6 from bottom, instead of "ram's," read "goat's."
 195, — 10, after "male" add, "and female."
 366, — 8, instead of "north-west coast of America," read "west coast of New Holland;" and line 23, "*Novæ Hollandiæ*," instead of "*Americæ septentrionalis*."
 397, — 23, after "Siberia" add, "for the discovery of the true rhubarb."

ANNALS OF BOTANY.



I. *Retrospect of Botanical Literature from 1801 to 1803.*

HE that is acquainted with the pleasures with which Flora rewards her votaries, will easily agree with Jean-Jacques Rousseau that botany is “the most lovely of the sciences;” but, casting his eyes on its present state, on the numerous volumes that record its gigantic progress towards perfection, will not so readily join the philosopher in calling it “the easiest of the three branches of natural history.” Time was when the whole pursuit of the botanist did not extend beyond a systemless partial acquaintance with a few plants, named at random, and considered scarcely under any other point of view than that of their medicinal virtues; and these usually the results of unphilosophical and superstitious premises. But the difficulties of this study increased with the more interesting form it assumed: in the last century, justly called the philosophical, when almost every branch of human knowledge experienced a thorough reformation, botany also advanced from its humble state to rank among the sciences; and now, though no longer encumbered with those deformities that obscured its real beauties, the limits are become so extended, that to cultivate it in all the departments the period of one man’s

life would scarcely suffice. This circumstance naturally leads to the *division of labour* ; a practice of the greatest utility in all extensive undertakings, and that by which the science of botany must also ultimately arrive at the degree of perfection of which it is susceptible. Every naturalist, therefore, who devotes his attention to a particular branch of botany, may contribute much towards the advancement of the science ; but still it must be allowed, that the intimate connexion, which subsists between its different departments, renders it necessary for him to keep pace in some degree with the discoveries made relative to those that are not the immediate objects of his labours. Upon this ground we hope that the retrospect of botanical literature, which we propose from time to time to lay before our readers, will not be deemed foreign to the purpose of our publication.

Without adhering closely to systematical arrangement of our materials, we shall commence with those catalogues of plants of particular regions commonly called *Floras*. The relative excellence of these publications is generally computed by the degree in which they facilitate the distinction of the vegetables on which they treat, and by the exactness displayed in their determination and description. This is undoubtedly a very important point of view ; and fortunate it were, if of the vast number of *Floras*, with which the botanical world has been of late inundated, a third part only could stand even this test : but there are other points, in our opinion, of equal importance. In order to advance a *Flora* beyond the narrow limits of local utility, and to render it applicable to more general purposes, the author should ever remember that it cannot be said perfectly to answer this end, unless it contribute towards the advancement of an hitherto neglected part of phytology, viz. the geographical history of plants. “ Plants,” as a popular author has justly remarked, “ are not scattered at random over the world ;”
their

their various stations are the results of fixed laws: to become acquainted with these, and to explain a variety of phænomena in the vegetable world, as influenced by surrounding objects, there is no other mode than to treasure up all such facts as have a relation to them. And from whom can contributions to this effect more reasonably be expected, than from those who have professedly studied the vegetables of a particular district? Hence, besides the systematic exposition and more accurate description of the plants on which it treats, a Flora should contain every thing relative to the physico-geographical history of the country; its various soils, climate, and the changes it may have undergone from causes natural or artificial; as well as meteorological observations, so far as connected with vegetation, &c. Of all the authors of Floras, so few have attended to this necessary part of their labours, that we can only record some mere attempts, such as those of Dr. Wiebel, Count Waldstein, and Dr. Kitaibel; the first in his "*Primitiæ Floræ Wertheimensis*," published at Jena 1799; the two last in a valuable work on scarce Hungarian plants, which we shall have an opportunity of noticing hereafter.

But in giving an opinion of what we consider to be a desideratum in this department of the science, it is not intended in any way to detract from the merit of those botanists who have presented us with productions of this nature, in all other respects corresponding with the character they deservedly enjoy as botanical writers. Dr. Smith's "*Flora Britannica*" (30)*, as long as elegance of description, joined to acuteness of discrimination, continue to be admired in works of this nature, will maintain the distinguished rank it now holds among the few that can pretend to rival it. It would be superfluous in this place to add anything but the expression of our wish that the remaining

* The enclosed numbers refer to the list of complete titles of the works mentioned, at the end of the Retrospect.

volumes may not be long withheld from the public. Nor does the work entitled “English Botany” (31), the joint production of the same pen and the pencil of Mr. Sowerby, need our recommendation; it is in the hands of every lover of the science, and shows no decrease in that spirit which marked its commencement fourteen years ago. Of Mr. Relhan’s very useful *Flora of Cambridge*, first published in 1785, a second edition (32) has appeared, which enumerates 133 additional species, making the whole number hitherto discovered in that district amount to no less than 1344 species.

Nor whilst indigenous botany has found numerous votaries eager to promote its career, have the Floras of the British dominions abroad been less assiduously cultivated; witness the “*Plants of the Coast of Coromandel*” (64), a work the honour of which is mutually shared by Dr. Roxburgh, the munificent company that patronizes him, and the celebrated character under whose direction it still continues to appear. Of this *Flora*, which is carried on with unabated zeal, it is but bare justice to observe, that there is no botanical work extant, which, with so much elegance and utility, unites such comparative cheapness: this must at least be allowed by all with regard to the uncoloured copies, which, if less captivating to the eye, are nearly as instructive as the coloured ones.

Of Dr. Roth’s excellent “*Tentamen Floræ Germanicæ*” (49), begun in 1788, we now have before us the first half of the third and concluding volume. It contains the orders *Miscellanea*, *Filices*, *Musci*, *Hepaticæ*, and *Algæ* of the 24th class of the Linnean system; but from the last order the author justly excludes the Lichens, which, as having nothing in common with the rest, will be treated of separately, together with the *Fungi* of Germany, in the second part of the same volume.—Professor Hoffmann’s elegant *Botanical Pocket-book*, or *Flora of Germany* (10), continues

to maintain its rank as a convenient yet copious companion on botanical excursions. The two first volumes, containing all the 24 classes of the Linnean system, were published in 1791 and 1795: the volume of 1800, with 12 plates of grasses, is the basis of a new edition of the two former, and contains the first 13 classes: that of 1803, which has likewise 12 plates, contains the remaining Linnean classes of phænogamous plants. The purchasers have the option of the title-page and preface in German, English, or French.

Mr. Schkuhr of Wittenberg, whose persevering zeal in promoting the science of botany merits great commendation, has now finished his work on the plants indigenous to Germany, or cultivated there in the open air (46). This publication, the product of twelve laborious years, comprehending, in three octavo volumes, about 1200 representations in 358 plates, it may easily be imagined that elegance and splendor cannot enter into the composition of the latter; but this want is fully compensated, not only by the great cheapness of the work, but particularly by the high degree of exactness in the figures and dissections. As the instructive letter-press is in German, and hence not universally understood, we are glad to find that Dr. Schwägrichen of Leipzig has undertaken a Latin translation (47), of which the first volume, containing 300 plates, has just made its appearance. Nor should we forget to mention that the latter part of the work, containing the species of *Carex* (and which will likewise be published separate with additions), has been translated into French by Dr. Delavigne (48), now resident at Göttingen.

Mr. Sturm's delineations, accompanied with descriptions of German plants (51), on the plan of Panzer's "*Fauna Insectorum*," and Dr. Delavigne's French translation of it, with additions (52), will prove useful publications for those who have no opportunities to consult more expensive

works. The same may be said of Messrs. Drewes's and Hayne's delineations and dissections of German plants (53). Of the many Floras of particular districts of the German empire, within the limits of this retrospect, we can only notice the elaborate and complete one of the Wetterau by Drs. Gärtner, Meyer, and Scherbius (54); Dr. Bernhardt's useful catalogue of the plants in the vicinity of Erfurt in Thuringia (55); and Dr. Graumüller's accurate works (56, 57) describing the plants about Jena.

Nor have the botanists of Denmark shewn less zeal in arranging the plants of their country. Mr. Rafn, advantageously known by his work on the physiology of plants, and by several papers read to the Academy of Sciences of Copenhagen, has given his countrymen a Flora of Denmark and Holstein (59), of which we have before us two volumes, comprising the ten first classes of the Linnæan system, which the author has adopted with the alterations of Thunberg. Professor Schumacher, we understand, has published a Flora of the North and East of Seeland (60). From this quarter it is also that we have received more materials for the Flora of a part of the coast of Barbary, to which the researches of Shaw, Poiret, Vahl, and Desfontaines, have not extended: we allude to Mr. Schousboe's observations on the vegetables of Morocco (61). Mr. Schousboe, who was Danish consul in that empire, is the first scientific botanist that has travelled in those regions, if we except Spotswood, who published his catalogue of "*Plantæ Tingitanæ*," in the ninth volume (1696) of the Philosophical Transactions; and afterwards Mr. Masson and the Abbé Durande, who remitted specimens of plants to Europe.

Ever since the great Swedish naturalist published his "*Flora Suecica*," and that masterpiece of elegant composition the "*Flora Lapponica*," the zeal of his countrymen to promote the knowledge of the vegetable productions, spread

spread over the wide extent of the Swedish territory, has been sufficiently demonstrated in the labours of Leche, Rosén, Thunberg, Acharius, Retzius, Liljeblad, &c. The botanical treasures of both Swedish and Norwegian Lapland have of late been explored by Colonel Skjöldebrand, the ingenious and refined author of the "*Voyage pittoresque au Cap-Nord*," and who, we understand, is actually preparing a complete natural history of Lapland. Another traveller in those hyperborean regions is Mr. Wahlenberg, a young naturalist, whose ardour in the pursuit of botany, some years ago, urged him to undertake a journey into Swedish Lapland, which he penetrated to far beyond Torneo. With the same zeal he proceeded in the year 1802 on a second expedition towards the North Pole, when he pervaded Norwegian Lapland as far as the North Cape, the extremity of which he reached on the 21st of June of the same year. He then returned by Utsjocky, the most northern village in Swedish Lapland; where after ranging over wilds untrodden by the foot of science, he sailed down the river Kenri towards Torneo, and arrived at Upsal in the month of October. In this arduous but highly interesting tour Mr. Wahlenberg collected more than double the number of plants described by Linnæus in his *Flora Lapponica*, and among others fifty new mosses. We hear that he has already begun to communicate the results of his researches in a late volume of the *Stockholm Transactions*, which has not yet reached us.—As peculiarly useful to Swedish beginners in botany, we notice in this place Messrs. Palmstruch's and Venus's "*Swensk Botanik*" (58), a periodical publication, conducted upon the plan of the work entitled "*English Botany*," which has, indeed, evidently suggested both the idea and plan to the editors. Of this well executed work we have nine numbers before us, each containing six plates, and as many leaves of letter-press.—Professor Swartz has given us the second volume of
of

of his "*Flora Indiæ Occidentalis*:" the third and last volume of this important production has not yet made its appearance, but we hope will not long be withheld from the wishes of the public. The same may be said of this gentleman's "*Icones Plantarum Indiæ Occidentalis*," the delay in the appearance of which is perhaps to be attributed to the great distance at which the author resides from the place of its publication.—If Professor Thunberg's "*Icones Plantarum Japonicarum*" (65), of which the fourth decade has reached this country, do not completely answer the idea of excellent botanical representation, still the scarcity of the plants which form the object of this publication makes amends for deficiencies; nor can it be denied that some of them are tolerably well executed, and all express the habit. The last decade contains the following species: *Salix japonica*, *Ilex japonica*, *Celastrus alatus*, *Scilla japonica*, *Quercus glabra*, *Rubus palmatus*, *Arum serratum*, *Sterculia tomentosa*, *Prenanthes debilis*, and *Arnica japonica*.

Hungary is indebted to Count Waldstein and Dr. Kitaibel for a material part of her Flora, contained in their "*Plantæ rariores*" (45), two volumes of which are now finished. From a country diversified by mountains (that towards the north and east vie with the boldest alps of Europe), by deep valleys, immense forests, and boundless plains of various soil and fertility, but each stored with vegetables peculiar to itself—from such a country, explored by two excellent naturalists, it was reasonable to expect an abundant harvest; and such the present work affords, by which we are introduced to the acquaintance of many new and interesting plants. It also offers considerable matter for the meditation of the botanical geographer, who meets with an assemblage of plants, among which are some he could never expect; he sees a Flora decked not only with the products of the most northern and southern parts of Europe, but of Asia likewise, and even some of those
of

of the burning regions of Africa, besides many hitherto found exclusively in Hungary. The number of Asiatic, chiefly Siberian, plants is very considerable. *Nymphæa Lotus*, formerly considered as peculiar to Egypt, grows in the river Peoze, near Great Waradein: this remarkable plant is found thriving in the hot wells of that place, in a temperature of 95° of Fahrenheit's scale. The first volume is preceded by an exact topography of Hungary, its geographical position, its surface and appearance; with accurate descriptions of its mountains, caverns, plains, various soils, strata, and waters; as also of the state of the atmosphere, the changes which the climate has undergone, &c. The plates are executed in the same style as those of Jacquuin's "*Flora Austriaca*."

France cannot yet boast of a good general Flora. The "*Flore Française*" of M. Lamarck is a work more remarkable for plan and arrangement than for copiousness and accuracy. Nor have the plants of the neighbourhood of Paris found any describers since M. Thuilier, if we except some anonymous productions (39, 40, 41) which have little to recommend them. M. Delarbre has published a second edition of his *Flora of Auvergne* (36), comprising the plants which he observed on the mountains Puy-de-Dôme, Cantal, &c.; M. Guillemau jun. an useful elementary book on the study of botany, part of which contains a calendar of Flora, divided into twelve months, descriptive of plants that flower during each month in the district of Niort (42). Of *ci-devant* Alsace, a Flora was expected from the pen of the late learned Professor Herrmann of Strasburgh, but which has been interrupted by his untimely death. The publication of M. Stolz's *Flora of the departments of the Upper and Lower Rhine* (37), though not destitute of the merit of accuracy, cannot be said fully to compensate for this loss. M. Roucet's "*Flore du Nord de la France*" (35), comprising the plants of the departments de la Lys, de l'Escant,

l'Escant, de la Dyle et des Deux Nèthes, is recommended as an accurate performance; as is M. Thore's "*Chloris du département des Landes*" (38), which likewise contains a well written introduction to botany.

We owe much, however, to the exertions of French botanists, such as Desfontaines, Labillardière, &c. in the elucidation of the Floras of foreign regions; but, as within the period of this review, we only notice the late indefatigable Michaux. This zealous collector, who was lately cut off upon a new expedition he had undertaken, travelled for several years in the Levant, more especially in Persia, from whence he returned home in 1785, with a great stock of vegetable acquisition; but soon after commenced his tour of North America, whose fields and woods he explored, from the Bahama islands and the promontory of Florida to Hudson's Bay, for upwards of ten years. The first fruit of his researches (excepting detached observations communicated in periodical publications) was his work on the North American oaks, of which we shall say more in another place; the second his *Flora of North America* (62), which, though not without faults, may yet, when used with discrimination, be looked upon as an important contribution towards the knowledge of the vegetables of a part of the globe, which, notwithstanding the labours of Clayton, Walter, Bartram, Mühlenberg, &c. still offers an extensive field to botanical investigation.

This is the place to notice the "*Flora Helvetica*" (43) of Dr. Suter, upon the plan of Professor Hoffmann's *Flora of Germany*. The author of that concise and useful publication has not attempted the cryptogamic plants, nor has he indeed seen growing all the 1800 species enumerated in it, the greatest part of them being taken from Haller's "*Historia Stirpium Helvetiæ*;" but (with a few exceptions) he has not adopted any without having first examined them, at least in a dried state. The dissertation prefixed

to the first volume (written both in German and Latin) contains much interesting matter for the geological botanist.

From the zeal which now animates the Spanish botanists, we may soon expect to become completely acquainted with the vegetation of a country to which Nature has been unusually bountiful. The merits of several of them, in the knowledge of their indigtnous plants, are already well known : Don Ignazio de Asso's "*Flora Arragoniæ*" may be classed among the best works of this kind ; and Professor Cavanilles, who has signalised himself in different branches of science, as a writer of erudition, has also contributed much towards promoting among his countrymen the love of their Flora, by his "*Icones et Descriptiones Plantarum*" (34). This work, from the plan of which the plants of Spain were not excluded, is now terminated with the sixth volume, and will be succeeded by another publication, entitled "*Hortus regius matritensis.*" Don Mariano Lagasca, Don Donato Garcia, and Don Simon de Roxas Clemente, have drawn up an introduction to the knowledge of Spanish cryptogamic plants, of which the first part, containing the ferns and mosses, is inserted in the "*Anales de Ciencias Naturales,*" a periodical work, published at Madrid from 1799 under the direction of Professor Cavanilles and some other naturalists of that metropolis. If the progress of botany in Spain, before the latter part of the last century, was comparatively tardy, we may attribute it chiefly to the little encouragement held out to the student of this science ; but the munificence of the present government towards this, as well as other branches of useful knowledge, is such, that apathy itself would be roused to action. As a proof we need only mention the rich botanical gardens at Lima, Mexico, and the Canary Islands, and more particularly the late expeditions to Peru and Chili, to Santa Fé, New Spain, the Philippines, the interior of Africa,

Africa, &c. But an account of these expeditions can only enter into our plan in so far as they are connected with published results within the period of this retrospect : hence we shall notice in detail only that expedition which has given rise to the “ *Flora Peruviana et Chilensis* ” (63), the third volume of which has been lately published. Don Hippolyto Ruiz and Don Joseph Pavon, having been selected by their government to investigate the natural, and more especially the vegetable productions of Peru and Chili, proceeded on their mission from Cadiz in November 1776, accompanied by M. Dombey, a French naturalist, and by Don José Brunete and Don Isidro de Galvez, their draftsmen. They arrived in April of the following year at Lima, whence they began their excursions in that part of the world, proceeding to the delightful plains of Chancay, abounding in Monadelphous and Diadelphous plants. As early as 1780 some valuable results of their researches reached London and Paris, to which cities seeds and dried specimens were sent by Dombey. On their return to Lima they changed their route towards the province of Tarma, situate at the foot of the mountains, and bordering on the possessions of the free Indians : here they met with great inconveniences, but were amply rewarded by a fruitful harvest of plants, especially of the natural order of Orchideæ. Their next excursion from Lima, their head quarters, was to Huánuco, a town distant about 60 leagues from that capital of Peru, and to the districts of Chincao and Cuchero, whose thick forests would have yielded them a still richer harvest, but for the molestations and obstruction they encountered from the different tribes of native Indians. They then resolved to extend their researches into the kingdom of Chili, a country little known to botanists, except from the scanty accounts of Father Feuillée and Ignatius Molina. Our travellers went by sea to Talcaguano, traversed the districts of la Concepcion, Itata, Rere, Puchacay, Maule, San-Fernandes,

nandes, Sanjago, Quillota, and a part of the Andes, till then unsurveyed by any botanist; where, among other valuable discoveries, they found that useful tree known by the name of *Pinus chilensis*, a congener of which, the monarch of its forests, has been found in Norfolk Island, whose stem, according to the most authentic accounts, measures 210 feet below its branches!

Returning once more to the capital, in order to visit Huánuco, they remained in that neighbourhood for several months, treasuring up every object of natural history that occurred; when, on the sixth of August of 1785, a tremendous conflagration consumed, together with their whole baggage, all the collections they had made in Chili, along with their journals of the tour. Those only who know in what light an enthusiastic naturalist views his acquisitions, and how dear they are to him, when obtained by his own labour, through danger and hardships, can fully sympathize with our travellers in the pangs they must have endured at so severe a loss. But their misfortunes were not yet at an end; for, soon after this event, they received intelligence of another calamity, while the wound inflicted by the former was scarcely healed: their whole treasures, the fruit of two years industry in Peru and Chili, contained in 53 chests, and embarked on board the *San Pedro de Alcántara*, in order to be conveyed to Spain, were lost with the vessel on the rocks of Peniche, on the coast of Portugal. These are only a few of the many accidents that frequently blast the brightest prospects of adventuring naturalists: we therefore exhort every one who proposes to engage in enterprises of this nature, thoroughly to examine himself, to discover if he can command sufficient resignation to support him under such calamities.

Returning again to Lima, notwithstanding their great losses, they embarked with 29 boxes of natural productions, a great stock of living plants, and their most important

portant manuscripts, and arrived in their native country in the month of September 1788, after an absence of nearly 12 years. The number of their descriptions then amounted to 2400, and that of the drawings to 1800 : of these they first communicated to the public the new genera in "*Floræ Peruvianæ et Chilensis Prodrômus*," published at Madrid 1794, describing in Spanish and Latin 150 genera with representations of the sexual parts, in 37 plates. A second edition of this Prodrômus, in quarto, with the Latin text only, accompanied with additions by the authors, appeared at Rome in 1797. The Prodrômus was followed in 1798 by the first volume of the "*Systema Vegetabilium Floræ Peruvianæ et Chilensis*," containing essential characters of the genera and the differential characters of the species, as far as Octandria ; but we are not made acquainted with the reason why this was not completed before its authors proceeded to the publication of their "*Flora Peruviana et Chilensis*" (63), the first volume of which made its appearance in the same year. Of the latter excellent work the first volume contains the descriptions of 277 plants, with 219 figures on 106 plates ; the second volume, published the following year (1799), comprises the descriptions of 258 plants, with 203 figures in 116 plates ; and the third, which came out in 1802, 223 descriptions, with 171 representations in 102 plates. According to report, this important work will be completed in eight volumes, to which will be added supplementary volumes to contain those plants which have been remitted to Messrs. Pavon and Ruiz from the same regions by Don Juan Tafalla and others.

The vegetable productions of Portugal are also in a fair way to be soon better known. Professor Avellar Brotero of Coimbra, who has presented his countrymen with a useful introductory work, "*Principios de Botanica*," has now engaged in a "*Phytographia Lusitânica*" (34), a publication recording the scarcer plants of his country. The first

first volume of this truly useful work, embellished with eight plates, contains the following plants: 1. *Pinguicula lusitanica* L. (according to our author entirely different from *P. grandiflora*.) 2. *Ophrys vespifera*. 3. *Anthoxanthum amarum* B. (nearly akin to *A. odoratum*.) 4. *Panicum arenarium* B. 5. *Stipa humilis* B. 6. *Stipa arenaria* B. 7. *Asperula repens* B. in Algarve. 8. *Antirrhinum lusitanicum* Lam. 9. *Campanula primulæfolia* B. tab. 1. et 2. 10. *Campanula Lœflingii* B. not examined by Linnæus, but described by his pupil Lœfling. 11. *Viola lusitanica* B. 12. *Crepis intybacea* B. 13. *Centaurea tagana* B. tab. 3. 14. *Hippia stolonifera* B. (appears to be distinct from *H. minuta*.) 15. *Anthemis fuscata* B. 16. *Oenanthe apiifolia* B. 17. *Sison sylvaticum* B. 18. *Laserpitium tapsiæforme* B. tab. 5. 19. *Daucus meifolius* B. tab. 4. 20. *Pimpinella bubonoides* B. 21. *Linum setaceum* B. tab. 6. 22. *Anthericum planifolium* L. 23. *Myagrum iberioides*. 24. *Brassica scabularia* B. (*Sisymbrium Parra* L.) We here learn that the specific name which Linnæus has given to this plant owed its origin to a mistake. Vandelii sent the plant to the Swedish naturalist in a cover which had contained plants from *Parra* in Brasil; and this word, thus accidentally misplaced, he adopted as a trivial name. 25. *Genista falcata* B. 26. *Genista triacanthos* B. 27. *Lotus conimbricensis* B. 28. *Ervum varium* B. 29. *Astragalus cymbæcarpos* B. 30. *Armeria conimbricensis* B. 31. *Delphinium pentagynum* Lam. tab. 8.

The advantages that botany derives from the cultivation of exotic vegetables are very manifest in those publications commonly called *Horti*. Among these some are conspicuous as patterns of excellence, both in point of representation and description; such as Linnæus's "*Hortus Cliffortianus*," the "*Hortus Elthamensis*" of Dillenius, Jacquin's "*H. Vindobonensis*," and "*H. Schoenbrunnensis*," &c.; others, as merely *descriptive* of the plants cultivated during

during a certain period: and of these we mention *instar omnium* the “Hortus Kewensis,” a catalogue which, for general utility, is not equalled by any other performance of the kind. To expatiate on its excellences is not here our province; but immediately connected with it, and within the period of our examination, is the “Kew Plants” (71), a work which bears honourable testimony to Mr. Fr. Bauer’s superior skill as a botanical painter. On account of the difficulties that never fail to attend publications of this nature, its progress is rather slow: the first number, containing ten species of beautiful heaths, appeared in 1796; the second and third numbers, containing 20 species of the same genus, in 1797 and 1803. The “Kew Plants” are unaccompanied by descriptions; the highest compliment that could have been bestowed upon the artist by the editor, and a perfectly just one; for where nature is so faithfully represented by imitative art, description, the humble substitute for actual contemplation, becomes in great measure, if not altogether, superfluous.

In this place we may very properly mention two periodical works which continue to be published in London on the first day of every month, viz. “The Botanical Magazine” and the “Botanist’s Repository.” These, though not confined to the products of one particular garden, yet, as containing representations of cultivated plants only, may properly be ranked with the *Horti*. The “Botanical Magazine” (66) was begun by the late Mr. W. Curtis in 1783; but within the period of our retrospect it has been under the direction of Dr. John Sims. At the close of the year 1803, two hundred and three numbers had appeared of this work, containing 708 figures, and as many leaves of letterpress. As the progress of this work is much more rapid of late than in Mr. Curtis’s time, the contents of each number being increased from three plates to eight, it promises soon to become very important on account of the numbers of original delineations, all made from living plants

plants by that excellent artist Mr. Sydenham Edwards, with rare botanical accuracy. What adds much to the utility of this performance, is its very moderate price : eight plates, coloured in a style at least equal to those of Jacquin, besides the text, for the low price of three shillings, certainly exceeds in comparative cheapness every other work on natural history. We have, however, to regret the want of dissections of the parts of fructification, which indeed would have much increased the price. We shall have another opportunity of analysing this publication, which has given rise to several similar productions, and among others to the “*Botanist’s Repository*” (67), by Mr. H. Andrews, begun in 1797, and consisting at the close of last year of 74 numbers, which contain 342 coloured plates, taken from living specimens, accompanied by dissections ; a work where the artist struggles, with considerable success, to compensate for the total absence of science. “*A Review of the plants hitherto published in the Botanist’s Repository*” (68), by Mr. J. B. Gawler, is a very useful companion to the first part (as far as Pl. 132.) of this publication : the author’s scientific knowledge, since better known by the assistance he has given to the “*Botanical Magazine*,” has enabled him to correct the misnomers in the *Repository*, and to add the synonyms of other authors.

M. Ventenat, a gentleman to whom botany is indebted for many a useful contribution, has last year finished his well known work on the new and rare plants cultivated in the garden of M. Cels (73). It would indeed be a matter of just regret, if this interesting work (which has also found a German translator in Professor Römer of Zürich) should have been discontinued ; we are therefore happy in finding that its author goes on with it in another publication, under the title of “*Choix des Plantes*” (75), of which we

have some numbers before us. This is conducted entirely upon the plan of the former, only that it is not confined to the garden of M. Cels.

The plants of the rich and showy garden of Madame Bonaparte are now recording by the same naturalist, in the "Jardin de la Malmaison" (74), of which several numbers have appeared: a work which bids fair to vie with the most splendid of its kind, though it cannot be denied that the plates are of various merit. We shall have other opportunities, in the course of this periodical publication, to give a more detailed account of these, and other works, under their respective reviews.

The less we have heard of our Italian brethren and their performances, the more happy we are in finding that Father Nocca, the worthy director of the academical botanic garden of Pavia, has commenced an elegant work, entitled "Hortus Ticinensis" (72), in which he proposes to describe and figure all the plants in that institution, of which no satisfactory representations occur in the works of other authors. We have not yet heard of the appearance of a second number of this well conducted publication, but hope no obstacles have arisen unfavourable to its continuance; the first contains the following six plants:

Pl. 1. *Sisyrinchium convolutum*: spathis arcuatis compressis, subæqualibus, petalis ellipticis convolutis.—It has received its specific name from the petals hanging downwards early in the morning, but rolling themselves up after ten o'clock. Its country unknown.

Pl. 2. *Hesperis arcuata*: foliis difformibus, villosis-ciliatis, siliquis pedunculatis nodosis incurvis.—This annual species approaches to *H. lirata* Lam.; but its flowers are larger, and its pods neither pedunculated nor linear.

Pl. 3. *Anchusa dubia*: caule ramoso, foliis basi amplexicaulibus, calycibus frugiferis campanulatis maximis. (Lycop-
sis

sis lutea Lam.)—This ambiguous species participates of the characters of both *Lycopsis* and *Lithospermum*. Country unknown.

Pl. 4. *Ornithogalum Grimaldiæ*: scapo tereti, foliis basi vaginantibus lanceolato-acutis, floribus corymboso-racemosis.—The author introduces us here to the acquaintance of a fair botanist, Signora Durazzo-Grimaldi of Genoa, “quæ, a consuetudine sequioris sexûs dehiscens, rei herbariæ studio oblectat otium temporis, ripas proximi maris mediterranei herborisationis causa percurrit, neque agros tantummodo levissime devexos, sed et montes Ligures impervios amore stirpium rapta peragravit.” This species is related to *O. lacteum* Jacq., from which however it is perfectly distinct.

Pl. 5. *Geranium reticulatum*: caule ramosissimo, foliis multipartitis, laciniis alternatim oppositæque pinnatis, inæqualibus, decurrentibus.—Probably from the Cape.

Pl. 6. *Geranium menthæ-odorum*: caule villosissimo, foliis cordato-quinquelobis, mollissime tomentosis, pedunculis oppositifoliis terminalibusque. (*Pelargonium tomentosum* Jacq. Pl. rar. II.)—The first number contains also a very instructive paper: “monitum eorum causa editum qui ad botanicen introduci volunt.”

The royal gardens of Hanover have given rise to a very commendable publication, “*Sertum Hannoveranum*,” of which the descriptions to the three first numbers are by Professor Schrader, the figures drawn and engraved by Mr. Wendland, his Britannic majesty’s gardener at Herrenhausen. The fourth number is published by Mr. Wendland alone, who now continues the work under the title of “*Hortus Herrenhusanus*” (76). Though we must regret the former excellent botanist’s discontinuing his share in this work, yet it is but justice to say, that Mr. Wendland’s descriptions are good, and his figures, especially the

dissections, very faithful. The work will prove of the greater utility, as its price is moderate.

We are happy in announcing that, since Dr. Willdenow's promotion to the botanical chair at Berlin, the garden of that city, which had been before entirely neglected, is now in a more flourishing state than ever; and that the Professor has commenced publishing, under the title of "*Hortus Berolinensis*" (77), a work intended to contain the new and less known vegetables cultivated there. Two or three numbers will be published every year, each containing twelve plates, and as many leaves of letterpress.

Not exactly coming under the head of *Horti*, yet immediately connected with the subject, are the "*Fragmenta Botanica*" (70) of Professor Jacquin. This patriarch of the modern botanists originally proposed to incorporate the observations contained in this work, with the catalogue of the plants at Schoenbrunn, which he is actually occupied in preparing for the press: finding, however, that many of those observations could not well be understood without additional plates, he altered his plan, and resolved to publish them separately in the abovementioned work, which he proposes to continue, without confining himself to the plants cultivated in the garden of Schoenbrunn. The two first fasciculi of this truly useful and elegant work contain observations on 114 species of plants, partly new, partly incompletely understood, and most of them illustrated in 37 plates folio, by excellent coloured figures, in the disposition of which œconomy is consulted without any sacrifice of taste or perspicuity.

We now proceed to Monographs, or works confined to the history of single orders or genera, among which we shall have an opportunity to notice works highly valuable, and the greater part of them illustrative of a class which includes the most difficult tribes, namely, that of Cryptogamia.

gamia. Neither have the phænogamous plants been neglected. Dr. Host of Vienna, who had given a proof of his abilities as a botanical writer, by his Synopsis of Austrian plants, has presented the world with another work, which in point of elegance and correctness, both of the figures and description, may be safely compared to any other production of its kind : we allude to the “*Gramina Austriaca*” (102), of which two volumes are before us, each containing a hundred coloured plates in folio : the third volume, as the preface states, will contain about fifty more, together with remarks on their œconomical uses. The dissections of the flowers annexed are uncommonly accurate. The number of species entirely new is not inconsiderable, especially in the genus *Carex*, *Festuca*, and others. As a useful companion to this beautiful agrostographical work, we recommend Professor Koehler’s description of the grasses of Germany and France (103) ; a small publication, not of local use only, but containing many valuable general remarks compressed into the small size of a pocket-book. The fifty tables annexed to it are well calculated to give the student a general view of the genera and species of this interesting tribe of plants.

M. Decandolle, we are glad to see, continues his work on succulent plants (107) ; a tribe which, though it does not constitute a natural order, still agrees in many remarkable qualities, and which, on account of the difficulty attending the preservation of the species, imperiously demanded a work for itself. Except the figures of some of these plants dispersed in several works (and indeed very few are to be found among them that merit commendation) we had no other publication exclusively representing that tribe than Dr. Bradley’s “*Historia Plantarum Succulentarum*,” begun in decades in the year 1716, but discontinued with the fifth decade in 1727 : its figures express the habit well enough, but the text bears the character of the period in

which it was written. It is this work which appears to have suggested the idea of M. Decandolle's publication, of which we may say, that the importance of the object, the accuracy of the delineations, and the exactness of the Latin and French descriptions, unite to render it a most desirable production. We have 24 numbers before us, each containing six plates, drawn by M. Redouté, and printed off in colours.

M. Redouté, who merits the fame he enjoys as a botanical painter, is likewise publishing a work on the Liliaceous Plants (104), an order which gives full scope to the artist. Though this production may not detract from M. Redouté's reputation, yet we are afraid that its utility will not be found commensurate with its splendour,—as the plants hitherto depicted, though highly finished, are not the rarest, and have mostly been well figured in publications of a more moderate price.

Two works of equal merit, and equally conducive to elucidate the subject on which they treat, are the monographs of Chevalier Pallas and of M. Decandolle on the *Astragali*, a genus, or rather tribe of plants, which, on account of the difficulties attending the distinguishing its numerous species, of which almost all existing descriptions and figures are far from being satisfactory, required much an appropriate publication. The former of these naturalists, to whom botany in general, but chiefly the northern Flora, is so greatly indebted, has now concluded his work (105) with the thirteenth number; the whole comprising 90 coloured plates, of which 63 are representations of *Astragali*, the remaining seven of some nondescript species of other genera belonging to the Papilionaceæ; all executed in the style of those of the Flora Rossica. From the difference in their habit, he arranges all the species of *Astragali* known to him under six divisions:

1. *Astragali tragacanthoides*: mostly shrubby; old petioles

stems spinescent; leaves unequally pinnate; flowers mostly axillary, dense; pods small.

2. *Astr. alopecuroides*: caulescent; flowers mostly axillary in heads, seldom terminal; pods two-celled, small, within a persistent inflated calyx.

3. *Astr. onobrychoidei*: caulescent, afterwards shrubby; flowers in terminal racemes or spikes; pods naked, hard, acuminate, mostly two-celled.

4. *Astr. anthyllodei*: nearly without exception stemless, with a scape issuing from among the radical leaves; pods generally inflated, often of one cell.

5. *Astr. polypterophylli* s. *verticillares*: these approach, by their scapes, and by the nature of their pods, to the preceding division, but are distinct from all other known Diadelphous plants by the multiplication of their leaflets, of which 2, 3, 4, and even 5, often issue from one and the same point of the rachis.

6. *Astr. sesamoides*: flowers axillary in heads; pods varying much in shape, but all two-celled. The species of this division are almost all annual, and natives of Europe.

Although the genus *Astragalus* is so very extensive (Willdenow already enumerating 174 species), and although it is more than probable that many regions, especially of Asia and Africa, will be found, by future travellers, to abound in unknown species; yet Mr. Pallas has not discovered characters of sufficient weight for generic distinction; nay, he even thinks proper to incorporate with them the Linnean genus *Phaca*, which does not however make part of the present work. How far all this be justifiable, this is not the place to examine; but we proceed to M. Decandolle's (106) *Astragalogia* (more properly *Astragalologia*), in which we find the results of an opposite opinion to that of the Russian philosopher.

This splendid work, ornamented by fifty excellent plates from the drawings of Redouté, contains, besides an instruc-

tive introduction, the description of the species of six kindred genera of Papilionaceæ :

1. *Biserrula* of Linnæus, sufficiently distinct from all the others, by its compressed bilocular pods, marked on both margins with as many teeth as it contains seeds. Of this genus but one species is known.—2. *Astragalus*. Hither the author refers those papilionaceous plants the flowers of which have an obtuse keel, and their pods divided into two perfect or imperfect cells, by means of a partition originating at the *lower* suture.—3. *Oxytropis* (ὄξυς acutus, ῥοπή carina), with flowers the keel of which is furnished with an acute point, with pods divided by a partition originating at the *upper* suture. To these three genera with bilocular pods, of which the last (*Oxytropis*) contains, besides several of the *Astragali* of Linnæus and Pallas, all those *Phacæ* described by the latter in his *Siberian Travels*, with some nondescripts ; the author has added a description of three other genera, nearly related to them, but having one-celled pods ; these are :—4. *Phaca*, with an obtuse keel and one-celled pod ; a character that distinguishes it from *Oxytropis* ; whilst on the other hand, by an unbearded style and capitate stigma, joined to a peculiar habit, it is separated from :—5. *Colutea*, which M. De-candolle characterizes by a style that is bearded its whole length ; by a one-celled inflated pod ; and an obtuse keel, equal to or exceeding the wings in length. From this genus he has very properly removed the two herbaceous species (*Colutea herbacea* L. and *C. perennans* Jacq.), and formed them into a new genus, which he calls :—6. *Les-sertia*, distinguished by an obtuse keel, a curved, unbearded style, capitate stigma, and a compressed, membranous, unilocular pod. The introduction contains much interesting matter, from which we shall here only select some observations relative to the air contained in the pods of several *Astragali*, *Ciceres*, *Colutea arborescens*, &c. :
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the author found it to be atmospheric ; but when the pods had been kept under water for twenty-four hours, the proportion of the oxygen gas was considerably diminished, and entirely disappeared after a longer continuance in that situation. This naturalist had before observed (*Bulletin des Sciences*, An vii. No. 22.) a different change of air to take place in *Fucus vesiculosus* : the moment this plant was taken out of the water, its bladders were found completely filled with gas azote, which, upon the plant being exposed for some time to the open air, was transformed into atmospheric air.

Though prose as well as poetry may have, from time immemorial, joined in proclaiming the Rose the queen of flowers ; yet so little homage has been paid to her by botanists, that, generally speaking, she may still be pronounced the very opprobrium of the science. The latest publications on this genus are Guillemeau's "*Natural History of the Rose*" (110), and Rössig's "*Description of Roses*" (108) : both bear evident marks of superficial observation, are mere compilations, void of criticism, and therefore of little use to those who wish to become scientifically acquainted with the species they cultivate. The former of these authors has moreover revived even the fabulous accounts of imaginary species ; yet his work may be said to be a somewhat more amusing compilation than that of Mr. Rössig.—"*Roses drawn and coloured after Nature*" (109), by the latter (of which we have five numbers before us, each containing five plates, with short descriptions in German and French), is a publication not devoid of merit ; the strictures, however, which the preface contains, on Miss Lawrence's ¹⁸¹⁴ "*Collection of Roses*," are uncandid : for, to speak the truth, in point of botanical merit, this lady's performance is nearly on a par with Mr. Rössig's own work, and its execution is superior.

Besides

Besides Mr. Bauer's representations of *Ericas* in the above-mentioned "Kew Plants," we have still to notice Mr. Andrews's "Engravings of Heaths" (112), begun in 1794, and continued in numbers, each containing three plates, with as many leaves of letterpress. This publication, of which the 37th number has lately appeared, has considerable merit: the figures are in general very faithful, and the colouring, though rich, seldom glaring. As for the dissections which are added to the figures, they cannot be said to be altogether unexceptionable. More commendable in this respect, although inferior in point of elegance, are Mr. Wendland's "*Ericarum Icones*" (113), likewise published in numbers, each containing six species, with accurate descriptions in German.

By continued observation, joined to occasional consultation of the Linnean Herbarium, Professor Schrader has been enabled to settle the spiked flowering portion of the *Veroniceæ*; as appears by the concise but accurate "*Commentatio super Veronicis spicatis*" (114), published by him on his obtaining a professorship of physic at Göttingen. It is divided into four sections: the first containing some general observations on the genus, but particularly on the *Veroniceæ spicatae*; in the second we find a critical examination of *V. longifolia* et *maritima*, two species hitherto imperfectly understood; in the third the author shows the insufficiency of the Linnean subdivision of the genus, and substitutes others taken principally from the inflorescence; and in the fourth and last he treats exclusively on the spiked and bunched species, of which he gives the specific characters. The plates represent *Veronica maritima*, *media*, *villosa* S., *glabra* Ehrh., *longifolia*, *argentea* S., *australis*, *spuria*, *foliosa* Waldst. et Kitaib.

Dr. Wolff's well written dissertation "*de Lemna*" (115) is by no means to be forgotten in this place; it bespeaks much accurate observation, and puts it beyond doubt that
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all the known species of this genus belong to the second class of the Linnean system.

We conclude our review of the monographs on phanogamous plants, with mentioning two works illustrative of two very difficult genera of trees. The one is Mr. Lambert's "Description of Pinus" (118), a work which, in point of splendour and costliness, eclipses most of its rivals: for an account of it, we refer the reader to the review in this number of our work. The other publication, which indeed merits the high praises bestowed on it, is Michaux's "Chênes de l'Amérique" (116). The oaks of North America had been as undetermined, as those of several other parts of the globe still are: their leaves and fruits, upon which the botanist must chiefly depend for discriminating marks, are liable to material variation, according to the different stages of their growth, the whole habit of the tree in an adult state being often totally different from that which it assumed at an earlier period. In attempting to determine with stability such of the North American species of oak as he could procure, the only method that occurred to M. Michaux, was to cultivate them during a series of years. To accomplish this a long residence in that country has afforded him sufficient opportunity: he has carefully observed, from the first germination to their full growth, the many variations through which they pass. Thus has this indefatigable man been enabled to describe and figure the twenty species contained in the present work: the plates are by Redouté, and very well executed; though it cannot be denied that they would have proved far more instructive, had they been accompanied by dissections of the minuter parts of fructification, which, in the present time, should never be omitted in works of this nature. As for the synonyms, they are not in all instances to be depended upon. Mr. Kerner of Stutgard has given a German translation of this work (117), which is so well merited; out

how the plates could with propriety be coloured, as the title states, is what we are at a loss to guess. Another contribution towards the history of this useful genus, is Mr. Mühlenberg's paper on the different trees about Lancaster in North America* ; as is also a treatise of the industrious Don Luis Née†, on sixteen new species of *Quercus*, discovered on his voyage round the world, particularly in Mexico.

We shall now take a cursory view of the later publications relative to Cryptogamia, following the known Linnean orders of this class ; but previously make honourable mention of a general work, Mr. Dickson's "*Plantæ Cryptogamicæ*" (83), of which the fourth number comes within the period allotted to this retrospect. The well-earned praise unanimously bestowed on this performance, it is needless here to repeat : it has long been in the hands of all lovers of indigenous botany ; we have only to add, that it has found a republisher in Professor Römer of Zurich.

The insufficiency of the Linnean genera of Ferns was long felt by botanists ; but no attempt had been made to reform them, until Dr. Smith set the example, in his excellent and well known essay in the fifth volume of the Turin Transactions. The ice once broken, the work became more easy : he was followed by Dr. Bernhardt in his "*Tentamen novæ generum Filicum et specierum earum Germaniæ indigenarum dispositionis*," published in the first volume of Schrader's journal : but so difficult is it at present to give any degree of perfection to the arrangement of a family which is far from being well understood, that this botanist soon after was induced to alter entirely his original plan. In his "*Tentamen alterum Filices in Genera redi-*

* Tracts relative to Botany, translated from different Languages, p. 241.

† *Anales de Ciencias Naturales*, tom. iii. p. 260.

gendi," inserted in the second volume of the same journal, he arranges the genera as follows* :

FILICES GYRATÆ (capsules furnished with a ring).

A. *Sporangiis*† *midis* : 1. *Acrostichum* : Sporangia sessilia solitaria. 2. *Polypodium* : Sporangia pedicellata, punctatim aggregata. 3. *Gymnopteris* B. : Spor. pedicellata lineatim aggregata (ex. g. *Acrost. rufum* L.)

B. *Episporangio instructis* : α. *univalvi* : 4. *Onoclea* : Spor. pedicellata punctatim aggregata ; Episporangia communia oblonga demum rumpentia. 5. *Sphæropteris* B. : Sporangia pedicellata, punctatim aggregata ; episporangia propria, globosa, superne rumpentia. (*Polypod. medullare* Forst.) 6. *Polystichum* Roth. : Sporangia pedicellata, punctatim aggregata ; Episporangia propria orbicularia, medio affixa undique dehiscentia. 7. *Cyathea* Sm. : Sporangia pedicellata punctatim aggregata ; Episporangia propria ovata margine puncto affixa, ceterum ubique dehiscentia. (*Polypod. fragile* L.) 8. *Wibelia* B. : Sporangia pedicellata, punctatim aggregata ; Episporangia propria, lanceolata, a basi ad medium usque affixa, ceterum libera. (*Trichoman. multifidum et elatum* Forst.) 9. *Davallia* Sm. : Sporangia pedicellata punctatim aggregata ; Episporangia propria semiorbicularia, margine circulari affixa, recto dehiscentia. 10. *Asplenium* B. : Sporangia pedicellata ; Episporangia propria, linearia, altero latere dehiscentia (this genus contains no less than the *Blechna* of Linnæus, the *Blechna* of Smith, *Woodwardia radicans* Sm., *Lonchitis* L., *Pteris* L.,

* Although the limits assigned to this retrospect do not include those botanical essays that are dispersed in several periodical works, yet the paucity of publications on the order of Ferns will warrant an exception with regard to this paper.

† With Hedwig, Dr. B. calls the seed-vessels of the Ferns *Sporangia* ; the covering (involucrum of Smith) he considers in a threefold view : 1. They cover the Sporangia at one side only : *Episporangia*. 2. The Sporangia are placed upon them : *Hyposporangia*. 3. They surround the Sporangia on all sides : *Perisporangia*.

Darea

Dana Sm., Hemionitis and Scolopendrium.) 11. *Lindsaea* Dryand.: Sporangia pedicellata lineatim aggregata; Episor. propria, sublinearia, margine repando dehiscentia.—*b. bivalvi*:—12. *Dicksonia* l'Her.? (may perhaps more properly be classed in the division D.) 13. *Vittaria* Sm.: Sporangia pedicellata lineatim aggregata; Episorangia propria.

C. Hyposporangia instructis: 14. *Lonchitis* B.: Sporangia pedicellata, punctatim aggregata; Hyposporangia propria, semiorbicularia, margine recto affixa, circulari-dehiscentia. (ex. g. *Polypod. Cafforum* L.) 15. *Adiantum* L.: Sporangia sessilia lineatim aggregata; Hyposporangia communia oblonga, altero, latere dehiscentia.

D. Perisporangio instructis: 16. *Dennstaedtia* B.: Sporangia pedicellata, punctatim aggregata; Sporangiorum (stylus, columella aliorum) nullum. (ex. g. *Trichomanes flaccidum* Forst.) 17. *Trichomanes* L. Sporangia sessilia, Sporangiorum filiformi affixa. (Dr. B. unites *Trichomanes* and *Hymenophyllum* of Smith, because he is of opinion that no certain limits can be drawn between them.)

H. FILICES AGYRATAE (without a ring).

A. Sporangis unilocularibus: *a. nudis*: *a. solitariis*: 18. *Osmunda* B.: Sporangia globosa, bivalvia (ex. g. *O. Lunaria*, *O. virginica* of Linnæus.) 19. *Dana Sm.*: Sporangia subglobosa, rima superne dehiscentia. 20. *Huperzia* B. Sporangia oblonga, bivalvia (those species of *Lycopodium* L. which bear their fructification in the axils of the leaves.) *β. punctatim aggregatis*: 21. *Struthiopteris* B.: Sporangia subglobosa bivalvia (ex. g. *Osmunda regalis*, *cinnamomea*, *claytoniana* of Linnæus.) *γ. lineatim aggregatis*. 22. *Todea* Willd.? Sporangia subglobosa, bivalvia. 23. *Angiopteris* Hoffm.: Sporangia subglobosa, rima superne dehiscentia. 24. *Odontopteris* B.: Sporangia subglobosa, rima transversa latere dehiscentia (*Ophioglossum scandens* L.) 25. *Ripidium* B.: Sporangia subturbinata,

nata, supra concentrice striata, rima latere dehiscentia.
b. episporangis testis : a. solitariis. 26. *Lycopodium* :
 Sporangia oblonga bivalvia ; Episporangia singularia per-
 sistentia (those Linnean Lycopodia which bear their Spo-
 rangia in spikes). 27. *Gisopteris* B. : Sporangia subglo-
 bosa, rima dehiscentia ; Episp. singularia, persistentia (*Hy-
 droglossum palmatum* Willd.). *β. lineatim aggregatis.*
 28. *Ophioglossum* : Sporangia subglobosa, semibivalvia ;
 Episporangia? caduca. (ex. g. *Oph. vulgatum* L. and perhaps
 all *Ophioglossa*, with the sexual parts on a proper scape.)

B. *Sporangiis 2—4-ocularibus* : 29. *Tmesipteris* B. :
 Sporangia nuda, solitaria, bilocularia, didyma, lobis biseri-
 vibus. (*Lycopod. tannense* of Sprengel.) 30. *Gleichenia*
 Sm. Sporangia nuda, solitaria, trilocularia, loculo quo-
 libet rima dehiscente. 31. *Bernhardia* Willd. Sporangia
 nuda, solitaria, 3—4-ocularia, 3—4-valvia. (*Lycopod. nu-
 dum* L.)

C. *Sporangiis multilocularibus* : 32. *Marattia* Sw.

Without entering in this place into a close exami-
 nation of Dr. Bernhardt's arrangement, we shall con-
 tent ourselves with just giving a few remarks upon his
Ripidium, which, we hope, will not be deemed super-
 fluous. This genus is formed by Dr. B. from *Acrostichum*
dichotomum Forst. of which he had received specimens
 from Professor Sprengel. It is well known that this
 plant, together with *Acrost. pectinatum* L. and *A. elegans*
 Vahl., had been before reduced into a genus called *Schizea*
 by Dr. Smith ; but our author has a mistaken notion, that
 it is totally different from *Schizea dichotoma* Sm., which
 he supposes to be Linnæus's, not Forster's plant. Without
 examining whether Forster's and Linnæus's plants are the
 same*, we can affirm that Dr. Smith meant no other than
 the

* We cannot, however, omit observing, that from Murray's edition of
 Linnæus's "Systema Vegetabilium," (in the Banksian library) in which
 the

the *A. dichotomum*, brought from the South Sea under that name, by Sir Joseph Banks, and afterwards by Forster and others. What probably induced Dr. B. to think *Schizea dichotoma* different from Forster's plant, which he had examined, was its being classed by Dr. Smith under "*Filices annulatæ*," to which it certainly belongs, with all the other species of *Schizea*, though Dr. B. has arranged it under his "*Filices agyratæ*." The ring in this genus has, indeed, a different position, and is less conspicuous than in other annulated ferns; whence it might easily have been overlooked by Dr. B.: but he says himself "*gyrum filicum gyratorum hic quasi ad apicem translatum vides*." Upon examining more minutely the capsules of the different *Schizeæ*, we find that Dr. Bernhardt's delineations of them are more accurate than part of his description; he describes the Sporangia as "*supra concentrice striata*;" the figures on the contrary express a surface with radiated striæ, as we likewise observed with a microscope, and these are nothing else than the articulated ring in a contracted state. This ring is not in the middle of the capsules; it is generally to be perceived towards one of the extremities: but the same construction exists also in the more regular capsules of many other annulated ferns. This may serve for an instance that Dr. Bernhardt's alterations are not always strictly correct: but let us not defraud him of his due praise; we acknowledge his talent for minute investigation,

the plants of the Linnean herbarium are marked by Dr. Smith himself, it appears, that *Acrost. dichotomum* is not contained in that collection; whence it is probable that Linnæus had not seen the plant, and that it has been adopted by him from the figure of Petiver. Nor is it improbable, what Mr. Dryander pointed out to us, that Linnæus's plant is the same with the species of *Schizea* from New Holland, lately described by Professor Willdenow (in the Erfurt Transactions) under the name of *Schizea bifida*; for, indeed, among the specimens of this plant in the Banksian herbarium, there are several completely resembling the figure given by Petiver.

though

though we cannot always subscribe to the deductions he draws from them.

Another valuable treatise that remains to be mentioned in this place, is Dr. Swartz's "*Genera et species Filicum, ordine systematico redactarum, adjectis synonymiis et iconibus selectis nec non speciebus recenter detectis,*" in the second volume of Professor Schrader's botanical journal. It contains upwards of five hundred definite species, and about two hundred which require further investigation. The arrangement of the genera is entered upon with great precaution; there are few new genera added, but the old ones are amended with a considerable share of precision. It appears to us that the Doctor has made a very proper alteration in the old genus *Polypodium*, from which those species whose heaped capsules are covered with an umbilicated or dimidiated integument (or *indusium* as he calls it) are detached under the name of *Aspidium*, a genus which is certainly very distinct from *Polypodium*.

We must consider as a posthumous work of the great Hedwig the "*Filicum Genera et Species,*" a number of which was published by his son, Dr. Romanus Hedwig, in 1799; it contains several species of *Trichomanes*, as do the succeeding numbers, published under the title of "*Filices*" (99), which are the sole work of Dr. R. Hedwig. The figures, by the author himself, though not elegant, are correct: the descriptions may be said to unite both qualities.

On no vegetable order has a more satisfactory light been thrown of late than upon the *Musci*; nor in a shorter space of time. The discoveries which we owe to the late Professor Hedwig are too well known to stand in need of our recapitulation. One of the most sanguine wishes of this excellent man was to live to finish two works, namely, his *System of Vegetable Physiology*, and his *Species Muscorum*; but fate denied it. At his death, however, half

the latter work was complete, and some materials and drawings for the remainder were found among his papers. To arrange these materials, and to supply what was wanting, fell to the share of one of Hedwig's most distinguished pupils, Dr. Schwägrichen, who by the publication of the "*Species muscorum frondosorum*" (97), has placed a new wreath on the urn of his departed master. In arranging this work (to which are subjoined the life of the author, and some of his general remarks on the organization of vegetables, and on the generic characters of the cryptogamous plants) the editor has strictly followed Hedwig's system; the primary characters being derived from the nature of the orifice of the capsules, its teeth and ciliæ, which are very constant both in point of shape and number; and the subdivisions from the form and situation of the male flowers. The following is an abstract of the Table of the genera prefixed to the work:

I. Sporangio astomo: *Phascum*.

II. Sporangio stomate instructo.

A. Peristomate nudo (*gymnostomii* s. *aperistomii*) orificiū munimento nullo; *Sphagnum*, *Gymnostomum*, *Anictangium*.

B. Peristomio instructo (*ochyrostomi* s. *esthiostomi*):

1. Peristomio simplici (*haploperistomii*): α. dentibus integris: α. dentibus quatuor; *Tetraphis*, *Andreæa*. β. dentibus octo; *Octoblepharum*, *Splachnum*. γ. dentibus sedecim: * capillaribus; *Encalypta*, *Pterigynandrum*, *Cynodontium*, *Didymodon*; *Tortula*, *Barbula*. ** dentibus pyramidalis; *Grimmia*, *Weissia*. δ. dentibus ultra triginta conniventibus in membranam conflatis, flore masculo femineoque terminali; *Polytrichum*.—b. dentibus fissis; *Trichostomum*; *Fissidens*, *Dicranum*.

2. Peristomio duplici (*diploperistomii*). Peristomio interno: α. dentato-membranaceo: *Webera*, *Buxbaumia*. β. dentato-membranaceo, membrana interna sulcata in
conum

conum contracta, apertura lacinulata, flore hermaphrodito; *Bartramia*. c. dentato-reticulato; *Fontinalis*, *Meesia*. d. dentato ciliato: α. dentibus liberis; *Neckera*, *Orthotrichum*. β. cohærentibus basi membranacea; *Timmia*, *Pohlia*, *Leskea*; *Mnium*, *Bryum*, *Arrhenopterum*, *Hypnum*, *Funaria*.

Dr. Bridel has, we find, just now added a third part to the second volume of his "*Muscologia recentiorum*" (96). The first volume of this useful work, published in 1797, contains a very well written introduction to the knowledge of the mosses in general, a complete terminology, together with an exposition of the different muscological systems; nor has the physiological part been neglected, in which the discoveries of Hedwig and others relative to it are given with great exactness. The second volume enumerates, after Hedwig's system, all the mosses which were known to the author, either from his own observations or from those of other writers, together with several new species. The descriptions are precise and elegant, and the critical remarks very pertinent. The third part of the second volume is supplementary.

Dr. Acharius has at last presented botanists with his long expected work on the natural order of Lichens; we say order, for as such (with the addition of the *Byssi pulverulenti et perennantes*) this author has now treated the overgrown Linnean genus Lichen. In his first publication, "*Lichenographiæ Sueciæ Prodrômus*," which bespoke his intimacy with the subject, the Doctor divided the Lichens, according to their stem, into *crustacei*, *foliacei*, and *caulescentes*; these he subdivided into twenty-eight tribes, each with its peculiar title. In the elaborate work before us, "*Methodus Lichenum*" (95), containing all the species of *plantæ lichenosæ* that have either come under his own observation or are known to him from descriptions and representations of other botanists, the arrangement is entirely drawn from what he calls the *organa carpomorpha*,

according to which he throws them under three divisions, subdivided into twenty-three genera, which, as it appears to us, are formed with great precision. Without entering into details incompatible with our plan, we shall give the outlines of our author's arrangement, previously bringing the reader acquainted with the terms peculiar to him.

The stem or rather body of the Lichens (*truncus* of Hedwig, *frons* and *receptaculum* of Willdenow) he calls *Thallus*, a Greek word for *frons*, which he deems less applicable to these plants. *Apothecium* is Gærtner's *theca*, the receptacle as it were, bearing, containing, or surrounding the organs of propagation, and generally differing from the thallus by its form, substance, and colour. These also constitute what the author calls *corpora carpomorpha*; which denomination seems correct, as, from Gærtner's observation, it is probable that such bodies (*sporæ*) as are contained in them, are not analogous to the fruits of phænogamous plants. As subdivisions of *Apothecium* he gives: *Scutella*, *Patellula*, *Cyphella*, *Lirella*, *Pilidium*, *Orbilla*, *Pelta*, *Trica*, *Thalamium*, *Tuberculum*, *Cistula*, *Cepalodium*, and *Globulus*. *Sporæ* (*semina* Hedwig, *propagines* Gærtner) are those minute organical globules, on or within the apothecia; in some they are covered by a delicate membrane, called *Theca*. *Propagula* are with him those small organic bodies dispersed on the surface of the thallus; or cohering in a mass, which by some have been taken for the pollen or male flowers, but which, according to Micheli and Schmiedel, germinate and multiply. *Soredia*, chiefly consisting of masses of *propagulæ*; often found on proper receptacles, or issuing from the substance of the thallus. Excrescences of a similar nature are his *Pulvinuli* and *Uerrucæ*. The stalks by which the apothecia of some Lichens are supported, and which are a continuation of the substance of the thallus, he terms *Podetia*; and those long, narrow, slender and depending branches, *Lorulæ*.

The

The genera are arranged as follows :

I. STEREOTHALAMI (στερεω privo, and θαλαμος) : Apothecium 0 ; propagula nuda, sparsa vel aggregata. Genera : 1. *Pulveraria* Achar. (2 species ; *Lichen chlorinus* et *L. latebrarum* Ach. pr.) nearly related to the plantæ byssoidææ. 2. *Lepraria* Ach. (*Lepra* Hall. Wigg. Pers., *Byssi pulverul.* Linn.) Eight defined and three undefined species ; the author suspects them all to be the mere rudiments of other Lichens, whose Apothecia have not yet been accurately observed. 3. *Spiloma* Ach. (4 sp. approaching in habit to the *Leprariæ* and the following genus). 4. *Variolaria* Pers. (*Verrucariæ* Hoffm. Wigg., *Herpetides* Hall.) 7 sp. nearly allied to the *Leprariæ*.

II. IDIOTHALAMI (ιδίος proprius) : Apothecium e propria substantia compositum, nec a Thallo ullo modo formatum, colore ab eo diversum (plerumque atrum) compactum, duriusculum ; Sporæ nudæ, nec thecis obvolutæ (excepto Endocarpo). * Apothecia aperta : 5. *Opegrapha* Pers. (24 sp. ; approaching to *Hysterium* Pers., but differing from it by the presence of the Thallus, and the nature of the Lirellæ.) 6. *Lecidea* Ach. (*Patellariæ* Ehrh. Hoffm., *Scutellulariæ* Schreb., *Verrucariæ* Wigg., *Psoræ* Hall. Hoffm., *Placodium* Schreb., *Imbricaria* Schreb., *Lobaria* et *Squamaria* Hoffm., *Umbilicariæ* Hoffm. Schreb. Schrad.) 99 species in 4 subdivisions. 7. *Calicium* Pers. (*Trichiæ* Hall. Hoffm., *Einbolus* Batsch., *Stemonitis* Gmel.) 18 species in two subdivisions : different from other genera in habit, and in having the Apothecia pedicellated, and the sporæ of the disk naked. ** Apothecia clausa demum dehiscentia : 8. *Gyrophora* Ach. (*Umbilicariæ* Hoffm. Schreb. Schrad.) 15 species. 9. *Bathelium* Ach. (a new genus from Sierra Leone, approaching to *Verrucaria*, from which it is distinct by its papilla opercularis, and by its ripe apothecia being quite empty. 10. *Verrucaria* Wigg. (*Sphæria* Web. Ehrh. Weig. Pers. Bernh.) 26 species.

11. *Endocarpon* Hedw. (Platismæ et Lobarizæ Hoffm., Verrucarizæ Schrad.) 10 species, related both to the Sphærizæ and Verrucarizæ.

III. CORNOTHALAMI (*κοινὸς* communis): Apothecium ex ipso thallo formatum, ejusdemque substantiæ ac coloris; Sporæ thecis inclusæ (excepto Sphærophoro): * Apothecia composita, pertusa vel hiantia: 12. *Thelotrema* Ach. (Sphærizæ Wigg. Weig. Web. Bernh.) 5 species, differing from the Endocarpi by having their apothecia elevated above the crust and partly formed of it; while in the Endocarpi these parts are hidden within the substance of the crust. ** Apothecia subglobosa clausa, demum rumpentia: 13. *Sphærophoron* Pers. (Coralloides Dill. Hoffm., Stereocauli Hoffm. Schreb.) 3 sp. Lichen globiferus, sterilis and fragilis Ach. Prodr. to be distinguished by their cistulæ and thallus. 14. *Isidium* Ach. (Stereocauli Hoffm. Schrad., Lepræ Ehrh.) a dubious genus, coming near to Sphærophorum, from which, however, it is distinct by its peculiar crustaceous thallus, by a *stratum proligerum in pulverem non fatiscens*, and by the terminal globules of several of its species being present, even when other apothecia are wanting. (8 species, two of which doubtful.) *** Apothecia orbicularia aperta; margine thallo concolori, discum varie ambiente cincta: 15. *Urceolaria* Ach. (Verrucarizæ et Patellarizæ Hoffm.) a middle genus between Lecidea and Parmelia, from both which it is, however, distinct enough, by the disc of the apothecia being almost always concave, and immersed in the substance of the thallus, &c. (20 species, of which one dubious.) 16. *Parmelia* Ach., a large genus comprising 804 species, in 11 sections. **** Apothecia applanata, subimmarginata; strato proligero tenuiori ad superficiem solidiori supra omnino tecta. 17. *Sticta* Schreb. (Pulmonariæ, Peltigeræ, Platismæ, et Lobarizæ, Hoffm.) 14 species. 18. *Peltidea* Ach. (Peltigera Willd., Antilyssus Hall.) 18 species with
four

four subdivisions. 19. *Cetraria* Ach. (Lichenoides, Lobariæ; Squamariæ et Platismæ. Hoffm.) 8 species 20. *Cornicularia* Schreb. (Corniculatus Hall., Lobariæ, Usneæ et Coralloides Hoffm.) 8 spec. 21. *Usnea* Dillen. (5 spec.) ***** Apothecia convexa, plus minus globosa, extus crusta prolifera obducta; in thalli ramulis s. papillis et podetiis terminalia, persistentia, sessilia: 22. *Stereocaulon* Schreb. (Cladoniæ Willd. Pers., Coralloides Dill. Hoffm.) 9 species, of which four dubious. 23. *Bæomyces* Pers. (Tuberculariæ Wigg., Cladoniæ Schrad. Hoffm. Pers., Pyxidium Hill. Schreb., Coralloides Dill.) 49 species with 6 subdivisions.

The work has eight coloured plates, representing such new species as express most strikingly the character of the genera to which they belong; with magnified figures of the Apothecia.

It is to Professor Hoffmann that we are indebted for the first attempts towards a better arrangement of the Lichens. Not to be dispensed with by the student of this tribe, is this author's "*Plantæ Lichenosæ*" (94), of which we have seen three volumes. This publication, which appears in numbers of six plates each, four numbers forming a volume, is, like every other work of this botanist, distinguished by great accuracy and taste, and leaves us nothing to regret but the slowness of its progress.

The study of cryptogamous water plants (which are now almost unanimously separated from the Lichens) has of late much engrossed the attention of various excellent observers of nature, both in this country and abroad: the limits of that difficult order have been traced with considerable precision, and several attempts have been made to settle its genera; though, with respect to the latter, we are inclined to Mr. Turner's opinion: "that in a new arrangement the first step must be, to throw them (the submersed algae) into a general mass, paying no respect to

the genera as they now exist, all of which comprise plants of the most anomalous nature ; many Confervæ having the fruit of Fuci, some Fuci that of Ulvæ, and vice versa." We think, however, that first of all we ought to obtain a thorough acquaintance with their physiology, without which a proper arrangement can by no means be expected. Great praise is due to the zeal of a Roth, Stackhouse, Turner, Velle, Dillwyn, &c. ; but all their interesting contributions towards the elucidation of this subject, can be only said to have diffused a dawn of that light which we are confident will, ere long, disclose the real nature of these beings. We shall then probably be enabled to determine, whether some organic substances which are now classed with the aquatic cryptogamous plants, really do belong to the vegetable or animal kingdom ; a question which had been agitated before by different naturalists, and is now, with respect to the Confervæ, made again the subject of discussion by M. Girod Chantrans in his "*Recherches sur les Conferves*" (89). The object of this work is to prove, that some Confervæ, Byssi, Tremellæ, are real polypi, others habitations of these animals (*Polipiers*), and others again aggregations of polypi, so attached to each other as to form a tube. M. Chantrans has ever since 1793, when he communicated the first essay upon this subject to the Philomatic Society of Paris, devoted his time and study to its further investigation. One proof of his theory is taken from the analysis of the abovementioned bodies, which, compared with that of ordinary vegetables, had inclined in favour of animal nature : as, however, Vauquelin's experiments to the same effect have not afforded exactly similar results, more particular attention must be paid to a multiplicity of microscopical observations, which M. Chantrans has made on more than 80 species of the above genera, and which he has illustrated by a great number of figures. M. Decandolle, who endeavours to refute the doctrine of M. Chantrans,

trans, (in the *Journal de Physique*, tom. 54. p. 421.) urges, among other things, the improbability that beings, so like in form, colour, and manner of living, should be thus distinct in their nature. The objections of this naturalist are chiefly directed towards the second and third class (the *Polipiers* and the aggregations of polypi), on which M. Chantrans appears to lay greater stress than on the first class, of which he gives but three instances. The *Confervæ*, says M. Decandolle, cannot be habitations of Polypi, for no sort of aperture is observable in them that could give issue to these animals;—the same animalcules which are said to have formed such and such a *conferva*, are often found in waters not containing *confervæ*, or at least containing other species;—one and the same *conferva* is often inhabited by a great number of different animalcules, which cannot well be supposed to be all its constructors;—there are *confervæ* destitute of animalcules, even according to some of Girod Chantrans' own observations:—admitting all globules within the tubes of the *confervæ* to be animalcules, it would remain to be proved, that it is by them that the tube is formed, and that they have not rather entered in order to inhabit it. Against the existence of the third class (the aggregations of polypi forming a tube) it is chiefly objected, that it appears to be a law in the organical kingdoms, that all beings tend to divide, in order to *multiply* the individuals of their species; but are never seen to unite in order to *diminish* their number. Yet to observations which, like those of M. Chantrans, are the result of time and careful application, something more than theory should be opposed; we therefore recommend his work (which is written with great diffidence) more especially to the attentive examination of those English botanists who have already given unequivocal proofs of their ability in this difficult department. Even if the result of their observations should tend to refute the ideas of that author, his work will

will nevertheless bear honourable testimony to his industry and zeal ; the more so as it contains a variety of observations full as applicable to an opposite theory.

A work of quite a contrary tendency is Vaucher's "*Histoire des Conferves d'Eau douce*" (90), which contains most accurate observations on those fresh-water confervæ that are found in the department of Léman, and in the vicinity of Geneva. The author thinks he has discovered six different modes of propagation among the confervæ, after which he proposes to divide them into six genera or tribes :—I. *ECTOSPERMÆ* : the organs of fecundation adhering externally to the tube in the shape of grains. (10 species.) II. *CONJUGATÆ* : tubes with septa, each intermediate loculament containing a single grain. They are often found in lateral unison, in which state fecundation appears to be effected. (14 species.) III. *POLYSPERMÆ* : with internal and numerous grains. (two species.) IV. *HYDRODICTYA* : netted confervæ, of which each joint, according to our author, becomes a new plant, and again expands in the form of a net. (one species.) V. *BATRACHOSPERMÆ* : of which each ring, after being separated from the old plant, becomes a grain, and shoots out at all sides into new ramifications ; they are always enveloped by a gelatinous substance. (5 species.) VI. *PROLIFERÆ* : the tubes swell irregularly, and extrude from the protuberances a large number of filaments ; these protuberances afterwards separate from the principal stem, and reproduce the plant. (6 species.) The observations on the Tremellæ and Ulvæ that are subjoined, enhance the value of this work, which is moreover illustrated with 17 plates.

Mr. Dillwyn's justly esteemed publication on the British Confervæ (87) is, we are happy to find, continued with unemitting zeal ; and, as a proof of its being also favourably known abroad, has found German translators in Messrs. Weber and Mohr (88).

Mr. Turner, in his "*Synopsis of the British Fuci*" (93), has displayed to the student of submarine plants, all that was known with regard to the species of that difficult genus: this work was a desideratum, and its execution is such, that it will not derogate from the reputation which this gentleman enjoys as an excellent observer. Since the botanical public have already done it ample justice, any encomium, or further account of it from us, would be superfluous.

The same may be said of Mr. Stackhouse's well known "*Nereis Britannica*" (92), which has eminently contributed to throw light upon the history of British Fuci, and fully deserves the praise that has been bestowed upon it.

Professor Esper continues to publish his "*Icones Fuco-
rum*" (91), a work which might prove of still greater utility to the student of this genus, but for the residence of its zealous author in the very centre of Germany, where the examination of marine plants is attended with considerable difficulty and disadvantage. The first volume, which was begun in 1797, contains 111 plates; of the second volume we have the first number before us, containing the descriptions and figures of 24 species.

Dr. Persoon, to whom we are much indebted for illustrating that most perplexing tribe the Fungi, has added to his reputation of a first rate mycological writer, by his "*Synopsis methodica Fungorum*" (85), a very laborious work, illustrative of not less than 1526 species. When we reflect that this vast number is (with a few exceptions) the produce of the smallest half of Europe, chiefly of Germany, England, and France, and that the mycological riches of so many regions, as yet, in this respect, unexplored, must considerably increase that number, it evidently follows, that at some future period a man's life will scarcely suffice for the study of this difficult tribe alone. The more the species had accumulated of late, the greater the confusion which prevailed

prevailed as to species and varieties; the greater are the claims Dr. Persoon has upon public acknowledgment. The above species are classed under 72 genera, the names of which we shall communicate to our readers, together with the principal divisions.

CLASSIS I. ANGIOCARPI. *Fungi clausi s. semina ut plurimum copiosa interne gerentes.* Ordo I. SCLEROCARPI: *fungi duriusculi substantia interna molli:* 1. Sphæria (184 species subdivided into Xylariæ, Periphæricæ, Compositæ, Monostichæ, Pustulatæ, Circinnatæ, Cespitosæ, Simples.) 2. Stibospora (6 species). 3. Hysterium (15 sp.). 4. Xyloma (14 sp.). 5. Næmaspora (5 sp.). 6. Vermicularia (3 sp.). 7. Tubercularia (6 sp.).—Ordo II. SARCOCARPI: *Fungi carnosi farcti:* 8. Sphærobolus (1 sp.). 9. Thelobolus (1 sp.). 10. Pilobolus (2 sp.). 11. Sclerotium (16 sp.). 12. Tuber (4 sp.).—Ordo III. DERMATOCARPI: *Fungi membranacei, coriacei, aut villosi, intus pulvere farcti:* A. TRICHOSPERMI; *pulvere seminali filis intertexto:* 13. Balarrea (1 sp.). 14. Geastrum (6 sp.). 15. Bovista (4 sp.). 16. Tulostoma (2 sp.). 17. Lycoperdon (14 sp.). 18. Scleroderma (12 sp.). 19. Lycogala (5 sp.). 20. Fuligo (6 sp.). 21. Spumaria (2 sp.). 22. Diderma (11 sp.). 23. Physarum (16 sp.). 24. Trichia (11 sp.). 25. Arcyria (5 sp.). 26. Stemonitis (5 sp.). 27. Cribraria (11 sp.). B. GYMNOSPERMI; *pulvere nudo s. filis non reticulato:* 28. Licca (5 sp.). 29. Tubulina (2 sp.). 30. Mucor (9 sp.). 31. Onygena (1 sp.). 32. Hecidium (19 sp.). 33. Uredo (30 sp.). 34. Puccinia (11 sp.). 35. Trichoderma (9 sp.). 36. Conoplea (4 sp.). 37. Pyrenium (1 sp.).—C. SARCOSPERMI; *fructibus luculentis carnosis:* 38. Cyathus (7 sp.).

CLASSIS II. GYMNOCARPI. *Fungi carnosi semina (parva) in receptaculo (Hymenio) aperto gerentes.* Ordo I. LISTOTHECII; *membrana fructificans s. hymenium in laticem (gelatinam) demum solutum:* 39. Clathrus (2 sp.). 40. Phallus

lus (6 sp.).—Ordo II. HYMENOTHECII; *hymenium membranaceum indissolubile, sporulis pulverulentum*. * AGARICOIDEI, *hymenio cancelloso aut venoso*: 41. Amanita (6 sp.). 42. Agaricus (259 species, subdivided into Lepiota, Cortinaria, Gymnopus, Mycena, Caprinus, Pratella, Lactifluus, Russula, Omphalia, and Pleuropus). 43. Meruleus (25 sp.). ** BOLETOIDEI; *hymenium in tubos varios prominens*: 44. Dædalea (5 sp.). 45. Boletus (93 species, in five subdivisions).—*** HYDNOIDEI; *hymenium in aculeos aut dentes prominens*: 46. Sistotrema (12 sp.). 47. Hydnum (26 sp.). **** GYMNODERMATA; *hymenium læve aut papillosum*: 48. Thelophora (47 sp.). 49. Merisma (7 sp.). ***** CLAVÆFORMES; *fungi carnosissimi, elongati, pileo cum stipite confluentes*. 50. Clavaria (62 sp.). 51. Geoglossum (7 sp.). ***** HELVELLOIDEI; *pileus stipitatus, membranaceus, a stipite distinctus*. 52. Spathularia (1 sp.). 53. Leotia (9 sp.). 54. Helvella (10 sp.). 55. Morchella (8 sp.). 56. Tremella (25 sp.). 57. Peziza (151 species, subdivided into Tremelloideæ, Helvelloideæ, Parvæ, Glabræ, Coriaceæ, Stictis, Solenia). 58. Ascobolus (4 sp.). 59. Helotium (7 sp.). 60. Stilbum (16 sp.). 61. Ægerita (3 sp.).—Ordo III. NEMATOTHECII; *Fungi byssoidei*. 62. Ascophora (1 sp.). 63. Periconia (3 sp.). 64. Isaria (9 sp.). 65. Botrytis (4 sp.). 66. Monilia (12 sp.). 67. Dematium (17 sp.). 68. Erineum (7 sp.). 69. Racodium (6 sp.). 70. Himantia (6 sp.). 71. Rhizomorpha (3 sp.). 72. Mesenterica (3 sp.).

To add to the utility of his “Synopsis,” (and probably as a continuation of his excellent “Icones Fungorum minus cognitorum”) Dr. Persoon has commenced an elegant publication (86), in which he proposes to give the figures of the rarest species contained in that work. The first number comprises the following species: Fuligo violacea, Agaricus tenacellus, chalybeus, Lejopus carcharias, Sphæria circumscissa,

circumscissa, bullata, pomiformis, mammiformis, *Licea* bicolor, *Boletus infundibuliformis*, *melanopus*, *Sistotrema rufescens*. No tribe of plants stands more in need of the aid of the pencil than that of the Fungi, the form and substance of most of them not admitting of proper preservation, and few botanists possessing the skill and patience of Mr. Sowerby, who has consecrated a considerable part of his time to form models of English Fungi in their different stages, in which useful but arduous undertaking he has been eminently successful. The same ingenious artist, to whose persevering zeal the natural history of this country is so greatly indebted, has finished the third volume of his highly useful periodical work "*English Fungi*" (84). It contains 400 coloured plates, with short explanations and remarks, and will be completed by two or three supplementary numbers; the whole forming a work that may be considered as indispensable to the student of this natural order.

In passing through the wide field of botanical monography, the limits of this retrospect did not allow us to extend our review to such papers as are contained in the different periodical publications, many of which are entitled to particular attention, such as those of Smith, Salisbury, Dryander, Correa, &c. in the *Linnean Transactions*; of Jussieu, Ventenat, Decandolle, Desfontaines, in the *Annales du Museum*; of Willdenow, Link, in the *Memoirs of the Berlin Society*; of Bernhardi, Persoon, Roth, Sprengel, Nöhden, Borkhausen, Schrader, &c. in the latter gentleman's and Dr. Römer's botanical journals; of Hoffmann in the *Transactions of the Göttingen Royal Society*, and in the "*Phytologische Blätter*;" of Cavanilles, &c. in the *Anales de Ciencias naturales*, and many others of various merit and utility. We cannot, however, take leave of this subject, without submitting to the notice of our readers those valuable academical dissertations which, from
time

time to time, appear under the presidency of Professor Thunberg, and among which there are many illustrative both of old and new genera, most of the latter discovered by that celebrated naturalist himself, in those remote regions to which his investigation has been so usefully extended. As such academical performances are not easily procured, every botanist will approve of Dr. Persoon's plan of publishing those of Thunberg collectively in the manner of the Linnean *Amoenitates Academicæ*. Of this edition of the "*Dissertationes Academicæ Upsaliæ habitæ sub præsidio C. P. Thunberg (140)*," we have three volumes before us. The subject of the third is entirely zoological; the first contains, besides those on materia medica, eleven botanical essays, viz. *Genera nova Plantarum, Pars I.—VIII.; De scientiâ botanica utili ac jucunda, and De arbore toxicaria Macassariensi*. The contents of the second volume are (besides that on Benzoe) the following botanical dissertations: de *Gardenia, de Protea, de Oxalide, de Iride, de Ixia, de Gladiolo, de Aloe, de Erica, de Ficu, de Moræa, de Restione, de Myristica, de Caryophyllis aromaticis, de Acere, de Hermannia, de Diosma, de Melanthio, de Drosera, de Hydrocotyle, de Arctotide*. Those posterior to Dr. Persoon's third volume are: *Fructificationis partium varietates. Pars prior 1800, P. poster. 1802.—Aspalathus, Pars prior et poster. 1802.—Horti Upsaliensis plantæ cultæ. Pars I.—IV. 1802-1803.—de Blæria 1802.—de Antholyza 1803.*

The paucity of publications relative to vegetable physiology, precludes the necessity of dwelling at any length upon this subject. Senebier's "*Physiologie végétale*," though not exactly within the limits of our review, must be noticed here as not fully answering the expectation which such a name had raised. The five volumes, demonstrative of the author's industry, enumerate correctly enough what has been already advanced by other authors in this department; but they

they cannot be said to contain much original information. The chapter on the influence of the different agents on vegetation, especially of that of light, (by his experiments concerning which the author has long ago proved his talent for observation,) is by far the most prominent feature of the work.

The pamphlet of this author and M. Huber "On the Influence of the Air and several Gases on Germination" (130), contains very interesting observations, mostly confirming what had been before observed on this subject by M. Senebier himself and other physiologists. Experiments with the same view have likewise been made by M. Lefebure (131) with turnip seed. Both these publications are very well worth an attentive perusal.

M. Brissot Mirbel's well written "*Physiologie végétale*" (127) bespeaks an author possessed of great ingenuity, and undoubtedly contains new matter; but there is reason to apprehend that the greater part of the latter will not stand the test of an accurate repetition of his microscopic observations. It has been objected to M. Mirbel, that he has given too much scope to his imagination; and, indeed, his division of the vessels into simple and perforated ones, into true and spurious tracheæ, and the delusive representation he has given of them, appear fairly to warrant such imputation, however harsh it may sound.

Dr. Medicus's "*Beyträge, &c.*" (128) (Contributions towards the physiology and anatomy of plants) is concluded with the seventh number, and exhibits an odd medley of excellence, eccentricity, and inconsistency. Among the first we reckon all those important, practical, and new observations on the pith, the formation of the alburnum, of the bark, on the difference of buds, &c.: the latter may be instanced by the author's studied contempt for all microscopic observation, which he considers as leading to little else than error. Thus he maintains that plants contain no
real

real vessels, but that the sap moves up and down in the interstices that exist between the fibres. The same ingenious naturalist has lately published *Essays on the Physiology of plants* (*128), in two volumes, being a collection of those of his papers relative to this subject, which were dispersed in several periodical works, as the *Acta Palatina*, *Römer's* and *Usteri's Magazin*, &c., with additions. The first volume contains essays relative to the propagation of plants by seed, and the physiology of seeds in general; the other treats on vegetable propagation by means of the different species of roots.

To the admirers of Darwin's genius it may be pleasing to learn that his "*Phytologia*" has made its appearance in a German dress, under the title of "*Phytonomia*" (126), with remarks by Professor Hebenstreit of Leipzig.

On Dendrology, some meritorious publications remain to be noticed by us, which have made their appearance within the period allotted to this retrospect. Duhamel's "*Traité des Arbres*, &c." first published in 1765, is universally acknowledged to abound in excellent observations; and to have contributed much to bring into vogue the cultivation of useful and ornamental trees in France, as well as in other countries: the idea, therefore, of republishing this work, enriched with all the additions and discoveries made since its appearance, is certainly very commendable, if the execution be confided to able hands. The new edition now publishing at Paris in numbers, with plates by Redouté (120), is said to possess considerable merit. Dr. Pott's new and enlarged edition of Duroi's "*Harbkesche Baumzucht*" (122), or *Arboretum of Harbke*, the seat of count Veltheim, is a work that ought to be in the hands of every planter, and which, as well as that of Wangenheim on North American trees and shrubs, well deserves to be translated into English. A publication in numbers, remarkable both for the goodness of the figures and the mat-

ter it contains, is that of Mr. Schmidt on such trees as are suited to the climate of Austria. We have seen the first volume (1792), and several numbers of the second, begun in 1794, but do not know whether it has been continued since.—Oelhafen's instructive dendrological work, begun in 1767, is now continued by Mr. Wolf (119), who proposes, besides the materials left by Mr. v. Oelhafen, to introduce in it all trees and shrubs mentioned in Mr. v. Burgsdorff's writings. The last-mentioned writer, whose works throw so much light on the department of the cultivation of forests, is since dead; having concluded his career by a History of the principal timber trees (123). We pass over several other productions in this branch, which can only be interesting to overseers of woods and forests; but cannot omit mentioning, on account of its more general utility, Mr. v. Kospoth's descriptions and delineations of native trees and shrubs of Germany (124).—"The Woodland Companion" (125), by the ingenious Dr. Aikin, is well-calculated both to amuse and instruct such of the English youth as wish to become acquainted with the trees of their own country.

The last publication reminds us of the propriety of saying a few words respecting some other elementary books on botany. They are of two different kinds: first, those intended for the instruction of such students as are desirous of attaining a more intimate knowledge of botany, and are not to be deterred even by the least seductive form in which this science can be exhibited; and secondly, those written for the sake of young persons, especially of the fair sex, or such in general who desire no more than to obtain a certain degree of acquaintance with that part of the vegetable world which daily attracts their attention; but without pursuing it as a study, or devoting too great a share of labour to it. Publications of the latter kind cannot be considered as objects of education merely, but are likewise

wise entitled to the attention of the botanist, even if it were only to enable him to answer the frequent inquiries made after well-written popular works of this kind. The choice among those which we have is not indeed great; for most of them are either egregiously tiresome, or so frivolous as to create disgust even in the most puerile of their readers. The French appear to have succeeded better in this branch of writing than any other nation. Rousseau was, we believe, the first to adapt the science to the use of the fair; and his eloquent and amusing letters on the elements of botany, addressed to one of this sex, with a view of engaging the attention of her sprightly daughter, and exercising her talents upon such agreeable objects as plants, became most deservedly popular; though their insufficiency was soon felt. Dr. Martyn added to the value of his English translation of these letters, by subjoining four-and-twenty others, explaining the Linnean system, and in which the manner of the original is attempted with as much success as any writer desirous to imitate Jean-Jacques would reasonably expect. After this, various similar publications appeared, but none of them answered the end proposed.—In this place we have to notice Madame Chastenay's well written "*Calendrier de Flore*" (4), a work which, though not containing systematical information, is very fit to be put into the hands of young botanical amateurs acquainted with the French language, who will find themselves highly gratified by the perusal of it. Only the three first of 128 letters are dedicated to an exposition of the systems of Tournefort, Linnæus, and Jussieu; the rest comprehend desultory observations and reflections that show the fair author to be possessed not only of considerable knowledge of the subject, but also of the most refined sensibility, and a sprightly imagination. Of quite a different cast, and rather approaching to the antivestral, is the production of another fair writer: "*Lettres de Madame*

de C. sur la Botanique" (5), in which we find much to the praise of "*le galant Linnæus*."—Miss P. Wakefield's well known and useful "Introduction to Botany" has been lately turned into French by M. Ségur (3).—Professor Sprengel, of Halle, has displayed a great deal both of knowledge and taste in his interesting "Letters on Botany" (7); the first volume of which treats of the structure of vegetables, and the use of their parts; the second on the technical language. As manuals we have to notice Father Nocca's "Elementi di Botanica" (2); Professor Schrank's "Outlines of the Natural History of Plants" (8); Dr. Bernhardt's (9) and Dr. Wade's Syllabus (6).

The following are likewise to be reckoned among the introductory works on botany lately published: a new enlarged edition of M. Bulliard's "Dictionnaire de Botanique" by M. Richard (11), and M. Fontenille's "Dictionnaire des Termes techniques de Botanique" (12), which latter contains more than the title promises; Mr. Heyne's "Termini botanici" (13), of which nine numbers are published both in Latin and German, and illustrated with coloured figures from living and well selected plants; and, lastly, Professor Beckmann's "Lexicon botanicum" (10), in which the etymology, orthography, and prosody of the Latin botanical names are given with great erudition and accuracy.

From the subject of botanical elements, we proceed to a short account of what has been lately done in the department of the methodical arrangement of vegetables. Two works which, although prior to the period of this retrospect, we cannot pass unnoticed, are Jussieu's and Schreber's *Genera Plantarum*. These works made their appearance nearly at the same time, so that neither of their authors could avail himself of the observations of the other. Both have their respective excellences; witness the genera of grasses in Schreber's work. This is well-known to be an enlarged
edition

edition of Linnæus's *Genera Plantarum*, a task that could not have fallen to the lot of one more qualified for it than the celebrated President of the Imperial Academy Nat. Curiosorum. Jussieu's "*Genera Plantarum secundum ordines naturales disposita*," in which the natural affinities of such plants as were then known to its author are demonstrated with an acuteness of observation, and a comprehension of the subject, that can only be equalled by the perspicuity, with which he has developed the whole, is as yet not sufficiently known in this country; notwithstanding the high praise so deservedly conferred upon it*. We shall have an opportunity, on a future occasion, to give a more detailed account of this work, since a new edition, we are happy to hear, is in great forwardness. Several elucidations of Jussieu's natural method have been given by French botanical writers, of which we only mention that of M. Ventenat, in his "*Tableau du regne végétal*," in 4 vols. published in the year vii.; of M. Brissot Mirbel in the second volume of his "*Anatomie végétale*" (127), and of M. Deshayes in his botanical map, accompanied by a pamphlet (15), both illustrative of that method.

The last publication of that excellent naturalist Professor Batsch, whose premature death is so justly regretted by every one acquainted with his literary productions, was his "*Tabula affinitatum*" (17), and a general work on natural history, of which the vegetable part was intended to constitute a volume; but we do not know whether he lived to finish it, having heard only of the first part (16), giving the outlines of a new division founded upon natural affinities, and a clear and well-written exposition of his *Drupaceæ*, or the seventh division of the *Rosaceæ* of Jussieu.

John Gessner, canon of Zurich, who died in 1790, at the age of eighty-one, was the first who formed an idea of

* Dr. Smith, in his *Icones Plantarum* fasc. ii. 36, mentions it as a book "*quo doctiorem vix unquam videbit orbis botanicus*."

illustrating all the Linnæan genera of plants, by figures of the sexual parts of such species as appeared to him to exhibit most strongly the generic characters. In this task he employed a long series of years, and finished more than eighty large plates, according to Haller; to whom they were shown by the author, and who, in his *Bibliotheca Botanica*, vol. ii. p. 312, raised the expectation of botanists by mentioning them as "*vastissimum et pulcherrimum opus*." They, however, did not make their appearance till five years after Gessner's death, when Dr. Schinz of Zurich, rescued them from oblivion, by publishing the first number, under the title of "*Tabulæ phytographiæ*" (18), which was afterwards followed by ten others, each containing four plates. Though it must be owned that the utility of the undertaking would have been more manifest at the time when the appearance of the work was so anxiously expected, and that it is now superseded in some respect by others; yet it may still prove very serviceable to those who have no opportunity of consulting more expensive works of this kind: at any rate it will remain an honourable testimony to the persevering industry of this excellent man. The plates are uncommonly crowded, but without much impairing distinctness, and the dissections are upon the whole very correct.

Mr. Kerner, of Stuttgart, has begun "*Genera Plantarum iconibus illustrata*" (22), of which, we understand, the first centuria has appeared; but we have not yet been able to satisfy ourselves in what manner he has acquitted himself in this arduous task.

Professor Willdenow continues, with unabated zeal, his very valuable edition of the "*Species Plantarum*" of Linnæus (23). The first volume comprises the classes from Monandria to Pentandria; the second from Hexandria to Polyandria; the third from Didynamia to Polyadelphia. The first part of the fourth volume, containing the nineteenth

teenth class, is anxiously expected. We notice here the first part of a "Nomenclator Botanicus" (24) to Professor Willdenow's *Species Plantarum*; the second we presume is to appear at the conclusion of the work.—A very interesting and valuable publication will soon be finished in Professor Martyn's new and enlarged edition of "Miller's Gardener's and Botanist's Dictionary" (25), of which, at the close of last year, the eighteenth part had appeared, comprising the articles from *Sisyrinchium* to *Tabernæmontana*. It is well known, not only that the additions of the learned Professor are very considerable, but that he has displayed great judgment in the selection of them. A German translation of this work is commenced by Mr. Johannot (26), to which is prefixed an introduction to the Linnæan system. An original work of the same nature (27), is now carrying on in Germany by that excellent horticulturist Mr. Dietrichs: the first volume of this useful dictionary extends to *Asplenium*; the second to *Chamaesyce*.

A publication which on the score of utility ought not to be left unnoticed in this place, is that of Professor Cavanilles, descriptive of the plants which were demonstrated by him during 1801 and 1802, in his public botanical lectures in the royal gardens of Madrid. The first part of this work (28) is preceded by an elementary introduction; and the descriptions are accompanied by very pertinent observations.

Some works relative to medical botany remain to be mentioned; but as these are less interesting to botanists in general, and we have already extended our account beyond the limits proposed, we content ourselves with referring to the titles of the principal of them at the end of the subjoined list of botanical publications:

1801—1803.

1. D. VILLARS.—Mémoire sur les moyens d'accélérer les progrès de la botanique. à Paris, an ix. pp. 31. 8vo.
2. D. NOCCA.—Elementi di botanica, con varie tavole che illustrano el sistema Linneano disegnate del autore. in Pavia, 1801. pp. 189. 8vo.
3. (Miss P. WAKEFIELD).—Lettres élémentaires sur la botanique, écrites par une Anglaise à son amie, et trad. de l'Anglais par OCTAVE SEGUR. à Paris, an ix. pp. 232. 12mo.
4. Mme. V. D. C(HASTENAY).—Calendrier de Flore, ou Étude des fleurs, d'après nature. à Paris, an ix. 2 vols. pp. 950. 8vo.
5. ANON.—Lettres de Mme de C** sur la botanique et sur quelques sujets de physique et d'histoire naturelle, suivies d'une méthode élémentaire de botanique par L. B. D. M. 2 vols. à Paris, 1802. 12mo.
6. W. WADE.—Syllabus of a course of lectures on botany. Dublin 1802. pp. 50. 8vo.
7. K. SPRENGEL.—Anleitung zur kenntniss der gewächse, in briefen, mit K. Halle 1802. Theil I. pp. 421. Theil II. pp. 367. 8vo.
8. F. VON PAULA SCHRANK.—Grundriss einer naturgeschichte der pflanzen. Erlangen 1803. pp. 452. 8vo.
9. I. F. BERNHARDI.—Handbuch der botanik. Theil I. Band I. m. K. Erfurt, 1803. 8vo.
10. J. BECKMANN.—Lexicon botanicum, exhibens etymologiam, ortographiam et prosodiam nominum botanicorum. Gottingæ, 1801. pp. 232. 8vo.
11. BULLIARD.—Dictionnaire élémentaire de botanique, revu et presque entièrement refondu, avec 20 planches, par L. C. RICHARD. Edit. augmentée. à Paris, an x. 8vo.
12. MOUTON-FONTENILLE.—Dictionnaire des termes techniques

niques de botanique, à l'usage des élèves et des amateurs. à Lyon, 1803. pp. 444. 8vo.

13. F. G. HAYNE.—Termini botanici iconibus illustratis &c. Berlin. Heft I.—IX. 1799—1803. 4to. (Text Latin and German.)
14. ANON.—Entwurf eines pflanzen systems nach zahlen und verhältnissen. Prag. 1802. pp. 98. 8vo.
15. C. D(ESHAYES).—Carte botanique de la méthode naturelle d'A. L. de Jussieu, d'après le tableau du règne végétal du C. Ventenat. à Paris. an in. (4 large sheets, accompanied with a pamphlet of 94 pages, 8vo.).
16. J. G. C. BATSCH.—Beyträge zur pragmatischen geschichte, der drey naturreiche. Gewächreich. Th. I. 1802. 8vo.
17. —————Tabula affinitatum, quam delineavit et nunc ulterius adumbratam tradit autor. Vinariae 1802. pp. 282. 8vo.
18. J. GESSNER.—Tabulae phytographicae analysin generum plantarum exhibentes, cum commentario C. S. SCHINZ. Fasc. I.—IX. cum tabb. pict. nec non nigris. Turici 1795—1802. Fol.
19. W. CURTIS.—Linnæus's system of botany, so far as relates to his classes and orders of plants, illustrated by figures entirely new, with copious explanatory descriptions. London (1803) pp. 19. 4to. (A second edition with 2 col. pl.)
20. R. J. THORNTON.—New illustration of the sexual system of Linnæus, with picturesque plates, &c: &c. Fol. begun in 1799.
21. J. C. CRAMER.—Enumeratio plantarum quæ in systemate sexuali Linneano eas classes non obtinent, in quibus secundum numerum et structuram genitalium reperiri debent. Marburgi, 1803. 8vo.
22. J. S. KERNER.—Genera plantarum iconibus illustrata
Centuria

- Centuria I.* Erlangæ, 1803. cum fig. pict. 4to. cum fig. nigr. 8vo.
23. C. A. LINNÆ.—*Species plantarum exhibentes plantas rite cognitæ ad genera relatas, cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas.* Editio quarta, post Reichardianam quinta, adjectis vegetabilibus hucusque cognitis, curante C. L. WILDENOW. Berolini, Tom. I. 1797. pp. 1568. Tom. II. 1799. pp. 1340. Tom. III. 1800 seq. pp. 1474. 8vo.
24. L. F. COMES à HENCKEL DONNEUSMARK.—*Nomenclator botanicus sistens plantas omnes in Car. a Linné Spec. plantar. a Dr. C. L. Willdenow enumeratas.* Halle, 1803. 8vo.
25. P. MILLER.—*The gardener's and botanist's dictionary, corrected and newly arranged, &c. by THOMAS MARTYN, B. D. F. R. S. Fol. Part XVIII. containing No. 173—182.* 1803.
26. ————— *Gärtner Lexicon, in einem getreuen auszuge nach der neuesten von Dr. Martyn besorgten Englischen ausgabe, und mit zusätzen und anmerkungen von FRANZ JOHANNOT.* Frankfurt am M. Th. I. A—Bau. 1802. pp. 559. 8vo. Th. II. 1803.
27. I. G. DIETRICH.—*Vollständiges lexicon der gärtnerey und botanik oder alphabetische beschreibung vom bau, wartung und nutzen aller in und ausländischen gewächse. Mit einer vorrede vom Hn. Prof. KURT SPRENGEL.* Weimar, 1802. Bd. I. pp. 824. Bd. II. pp. 794. 8vo.
28. ANT. JOS. CAVANILLES.—*Descripcion de las plantas que demostró en las lecciones publicas del año 1801; precedida de los principios elementales de la botanica.* Madrid. 1802. pp. clvi. et 284. 8vo.
Generos y especies de plantas demonstradas en las lecciones publicas del año 1802. pp. 285—626.

29. J. J. RÖMER.—*Flora Europæa inchoata*. Norimbergæ. Fasc. I.—VII. 32 tab. æn. 1797—1801. 8vo.
30. J. E. SMITH.—*Flora Britannica*. Vol. I. Londini, pp. 436. Vol. II. pp. 437—914. 1800. 8vo.
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II. *Some Account of the Life and Writings of the late Dr. JOSEPH GARTNER, from the French* of M. DELEUZE.*

THE votaries of science constitute a commonwealth that has ever maintained itself amidst revolutions which have overthrown others. Its members, scattered through different regions, are united by common tastes and pursuits; their labours tend to a common end, and each finds a lively interest in all that concerns his fellow. All are desirous to be informed of whatever relates to the life of any one of them, who by his works, discoveries, and the lights he has diffused, is become the object as well of their affection as of their gratitude. This kind of history does not merely tend to gratify curiosity; it serves to raise a latent inclination towards the sciences into the flame of enthusiasm; it presents models for our study and imitation; it shows us at once both what has been done, and what remains for us to do: here we often find that the man of genius, after having opened to himself his career, has reached his goal by the shortest road, slightly glancing upon those paths that presented themselves in his course, and which, though he could not pursue them, he has marked out for those that come after him.

That the history of one who has devoted his life to the sciences should be rendered useful and interesting in the fullest extent, it is not enough that it presents a review of his works, an account of certain incidents, with a loose summary of his habits and general character: it should go further, and point out to us the means by which he arrived at truth; the use he made of the opportunities and resources that chance afforded him; how and what obstacles he surmounted in his pursuit after knowledge; together with such circumstances as may be supposed to have given the peculiar

* *Annales du Muséum national-d'hist. naturelle*, tome i. p. 207.

direction to his talents. It is true such details are only to be relied on when furnished by one that has known him from the cradle, and, acquainted with the secrets of his education, has attentively watched the developement of his mind and character.

Deprived of such materials, and without means to procure them, we are often induced to put together such prominent traits in the lives of celebrated personages as we can procure: first, to serve as some sort of tribute to their memories; to prevent a chasm in the history of the commonwealth of letters; and lastly, to evince to them who dedicate their lives to the sciences, the veneration we entertain for those that have trod these paths before them, and to hold up to their view the reward which they themselves have to look for at the hands of posterity.

Such motives as these have instigated several learned bodies to give to the world the lives of their members; a kind of biography that has in France been set apart in collections under the title of *Eloges*, and which are so well known to be in peculiar request among the followers of science.

Works on the sciences are but little read except among those who happen to have chosen the same department to labour in. The names of Linnæus, Haller, Newton, Euler, are dear in common to all the friends of knowledge; but the works of the two first will be only found in the closet of the naturalist, as the two last will be in that of him who makes geometry and physics his pursuit: nevertheless, we find the naturalist, the chemist, the geometrician, all equally eager to be made acquainted with those rare men whose works they have not leisure to contemplate; and it is only by details divested of the pageantry of science, that an acquaintance as useful as it is pleasing to them all, can be brought about.

The naturalist is at a loss to account for the total silence
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that has taken place in regard of a man who, pursuing in botany a path untrod before him, has caused that science to assume a new face, and whose work, copied into, and parcelled out among all those that have since appeared, seems equally destined to give law to the classification of plants, as comparative anatomy has lately been found to be in zoology; a silence only to be imputed to the storms of a revolution—to a war which, though it has not impaired the good understanding that ever exists among the learned of all nations, has for a time suspended their intercourse. I now present myself, though late, to repair the omission, not by panegyric, but by a simple narrative, in which, while I bring my readers acquainted with a man whose whole life was made up of continued study, I shall at the same time attempt to give some general idea of what he has done, and what he would have done had his career been longer. His son is now at Paris, where he is come with a view of continuing his father's work; and it is by him that I have been furnished with the principal part of the facts I am about to communicate.

Joseph Gærtner was born the 12th of March 1732, at Calw, a small town of Suabia, situated in the duchy of Wirtemberg. Soon after his birth he lost his father, who was physician to the duke of Wirtemberg; and about the same time his mother, whose maiden name was Wagner. His relations entrusted the care of his education to a doctor of divinity in the university of Tübingen, a man versed in the *belles lettres*, the elements of which he imparted to his pupil. He was afterwards sent to continue his studies at Stutgard; and as his friends designed him for the church, he was persuaded to apply himself to theology. Young Gærtner attended a course of lectures; but already ardently attached to natural history, mathematics, and physics, he seized every moment of leisure to cultivate these sciences: it was to the restraint thus caused, that he owed the habit he acquired

acquired of continual labour, and of finding relaxation in the mere change of study. His uncle, seeing the profession which he had chosen for his nephew was one for which he was not suited, but never dreaming that the study of the sciences could occupy the whole of a man's life, endeavoured to turn his mind to the law, and with this view sent him again to Tübingen in 1750. But this study, which offers a still narrower field for the imagination than even theology, soon disgusted him, and he abandoned it in order to dedicate himself to that of physic, as one more analogous to the bent of his inclinations.

After he had been eighteen months at Tübingen, he quitted that place and went to Göttingen, the university of which was already in great repute. He remained there till 1753, attending the lectures of Brendel, of Richter, of Roederer, and, above all, of the celebrated Haller, imbibing under them that passion for anatomy, physiology, and botany, which never after left him, but occupied the remainder of his life.

It was about this time that Gærtner, now twenty years of age, formed the resolution to devote himself wholly to natural history; and, furnished with a stock of elementary knowledge, with some experience, he proposed to visit in turns the most enlightened cities of Europe. After a short stay at Calw, he set off for Italy. He visited Venice, Ancona, Padua, Florence, Genoa, and Naples. He then entered France; made some stay at Lyons; passed six months at Montpellier, and as many at Paris. During his travels he was wholly taken up in observing the natural productions of the different countries through which he passed, in examining their various cabinets of natural history, and in consulting their men of science, particularly naturalists and anatomists.

In the spring of 1755 he proceeded to England, where he remained till the end of the same year, and then quitted that

that country to pass a few months more at Paris. On his return home he wished to be admitted into the body of physicians; not that he intended to practise, but in order to belong to a profession that afforded a title under which he could completely devote himself to his favourite pursuits. With this view he presented his inaugural dissertation—"de viis urinæ ordinariis et extraordinariis." Having obtained his object, he gave himself up for two years to mathematics, optics, and mechanics. Nor did he confine himself to the mere theory of these sciences: he constructed with his own hands a fine telescope, a common and a solar microscope, and by this means relaxed from mental application.

In 1759 he undertook a journey into Holland. He was at Leyden about the beginning of May, and remained till September following. It was here he attended a course of lectures on botany, under the celebrated Van Royen, with whom he formed the most intimate friendship, and thenceforward addicted himself entirely to natural history, regarding the other sciences merely as useful co-operating auxiliaries on his progress in this.

It has been rightly said, that the sciences lend each other mutual aid, and that those men who have excelled the most in any particular branch of them, especially such as have been discoverers, have generally cultivated several. If zeal for knowledge was the source of their inconstancy, it was, at the same time, most probably also the cause of their success. In passing over the varied domain of science, their genius has taken a bolder flight, and has been enabled to descry relations which had escaped it, if, constantly fixed on a single object, it had pursued but one track to arrive at this. Thus to mathematics Gærtner is indebted for his talent of precision, and that happy mode of analysing, which force themselves on our attention in every part of his work. From his knowledge of comparative anatomy arose the

lucky thought of applying that science to vegetables, and of advancing his researches into their most interesting and least variable part; into that part where all is necessary, where the organs are so concentrated that they always present a determinate form, a form that is the type of their kind. From having acquired a habit of drawing, he learnt to seize the most minute details, and exhibit them to the greatest advantage. Had he employed other hands for his figures, he would have lost more time in instructing and directing these than he himself employed in executing; nor would they have ever possessed that precision and clearness we now find.

Previous to his applying himself entirely to vegetable anatomy, Gærtner was desirous of putting the last hand to a work he had begun on fishes and sea-worms. On this account he returned to England, where, after having examined the collections of the curious in London, he paid a visit to the coast, and continued his researches along the shores of its seas. It was about this time that he composed a paper upon some Mollusca, afterwards inserted in the Philosophical Transactions; another upon Zoophytes, which Pallas has since published in his "*Spicilegia Zoologica*;" and several more on the anatomy of fishes, on cryptogamous plants; with other tracts which have never yet appeared in print. The most important paper among these is that "on the fructification and mode of propagation in *Confervæ*, *Ulvæ*, *Fuci*, and *Ferns*," of which the manuscript, with designs engraved by himself, is now ready for publication, and about to appear under the auspices of his son: a work highly interesting to the naturalist, as coming from the hand of an exact observer, and forming a supplement to that of Hedwig's Mosses; as well as from the probability of its throwing new light on a portion of cryptogamous productions as yet involved in the greatest obscurity, and in which hypothesis still abounds.

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From his visit to the coast Gærtner returned to London, where he remained a year longer, in which time he formed connexions among the most celebrated naturalists, such as Morton, Ellis, Collinson, Hudson, Birch, Walston, Baker, Dacosta, Edwards, and some others. In April he embarked for Amsterdam, and returned to settle at Tübingen. It was on his arrival there that he learned he had been admitted a fellow of the Royal Society of London. Shortly afterwards he was appointed to the professorship of anatomy at Tübingen, an employment that once more induced him to resume his pursuits in the comparative branch of that science. We find by several memorandums and drawings among the papers he has left, that he had been particularly engaged in researches concerning the organs of voice in various animals. This was then a subject on which little had been said; but its publication would at this time of day be of little use; as the philosopher who has treated comparative anatomy in one general view, and whose penetrating genius has diffused light over all its parts, has handled this subject with that sagacity and distinctness so peculiar to himself.

The reputation which Gærtner had acquired in England, soon spread his name over the rest of Europe. It was less due to any thing he had published, than to the opinion which those learned men, who were acquainted with his talents and labours, had themselves formed of him. It was that, however, which caused him to be nominated a member of the Imperial Academy of Sciences at Petersburg, and professor of botany and natural history in the same city. These sciences having more charms in his eyes than anatomy, he accepted the appointment, and betook himself to Petersburg in the month of June 1768.

Gærtner was now about six-and-thirty. He had been taught botany at Leyden in the school of Van Royen; had made it a part of his occupation during various journeys,
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and had acquired a general knowledge of it. Appointed to teach, he thought it became him to make himself thoroughly acquainted with details also. He was soon master of all that was to be learned from books; and perceiving that the investigation of the fruit had been till then neglected, he resolved to make this the chief object of his attention and studies; thus opening to himself a career that promised a source of observation that would employ the remainder of his days, as well as the prospect of founding a science entirely new. It was thus, in the beginning of 1769, he undertook that great work that has proved the chief source of his present glory, and by which he has for ever secured to himself the gratitude of all botanists.

The severity of a climate to which he was unaccustomed having deranged his health, he accompanied Count Orlov, who, in compliance with the wishes of the academy of which he was the director, and in obedience to the orders of the empress, was on the point of undertaking, attended by other men of science, a journey into the Ukraine. It was in this excursion that he collected a vast number of plants, the greatest part of which are yet unknown: these he described, and his son now proposes to publish them as a kind of supplement to Gmelin's "*Flora Sibirica*."

Returned to Petersburg, he had, to all appearances, reached the summit of his wishes. Respected by all ranks, he was caressed and resorted to by those who had any pretensions to science; he lived under the government of a princess by whom the arts were considered a chief instrument of glory, and was therefore profuse in their encouragement; his appointments were very lucrative. The superintendance of the imperial garden and cabinet of natural history, of which he had published the catalogue, was entirely confided to him. But although his duties as academician and professor left him but little leisure, he found he was obliged to give up much of his time to those
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Whom the desire of instruction or curiosity brought to him, and that it was not easy for him to keep up a correspondence with his former friends; he could no longer, when occasion required, betake himself to the chief cities of Europe, consult their learned men, or recur to their cabinets of natural history; the scheme he had formed of giving a complete history of fruits occupied all his thoughts, and gave him no rest; he sighed after retirement and the command of his time. In one of these moments he embraced the resolution of quitting Petersburg. Abandoning the prospect of preferment, and the path of ambition, he resigned his place to his friend Kölreuter, so well known by his ingenious experiments concerning the production of hybrid plants; and, reserving to himself the mere title of academician, he peremptorily refused a pension they wished him to keep, and which was the customary appendage of his situation in the academy. His motive was as delicate as unusual; he thought that in receiving an emolument he was bound in return to send contributions in some department of science, and was fearful lest the execution of this duty might, in some manner, interfere with the grand object to which he meant to give his whole attention. His fortune was far from being considerable; for, as he rested his happiness on a more stable basis—upon study and the hope of being useful—he had never viewed the sciences as the road to honours and riches; nor ever attached any other value to affluence than as it afforded independence, and facilitated the means of obtaining knowledge.

On his return from Russia (at the end of the summer of 1770), being now his own master, he resolved to avoid the confusion and bustle of a large town, and with this view fixed on his birth-place, Calw, for his residence. Here he married a lady of the name of Mutshelin; and

gave himself up without remission to the immortal work that occupied the remainder of his life, and which is the fruit of twenty years of labour. Sometimes, to unbend his mind, and that none of the fruits of his former industry might be totally lost, he formed catalogues of the different natural productions he had collected in his various excursions; at others he amused himself with putting together some piece of mechanism. It was from such relaxations that he returned with renewed vigour to the main object of his pursuit.

After having drawn out a general plan for his carpology, or history of fruits, and grouped its masses, he soon found that materials were wanting for its completion, and that such fruits as he could procure at a place like Calw were but a small part of those he wanted to examine. It was in England and Holland that he had seen the largest collections of these. He had observed them, it is true, and noted his observations; but these notes did not satisfy him. He felt the necessity of re-examining the fruits themselves, of describing them with the most scrupulous exactness, and of himself making designs of all their parts; reasons that quickly decided the project of revisiting these countries. This was a sacrifice far more painful to him than the one he had made in quitting Petersburg. He had to abandon a retirement which had been so long the summit of his wishes, the value of which was now enhanced by his union with a wife whom he loved, and the birth of a son. Having learnt, however, that Sir Joseph (then Mr.) Banks had returned from his voyage round the world, loaded with the riches of natural history, he resolved, without loss of time, to go himself in quest of the new light he was convinced he should find in this quarter, and accordingly set off for London in 1778. He was not deceived in the expectations he had formed; and the munificence

ficence of that illustrious patron of science, soon enabled him to execute the most valuable and curious parts of his work.

Sir Joseph Banks imparted to Gærtner all the fruits he had brought home, without reserve; allowing him not only to examine, but to dissect and analyse them for his drawings: he freely gave all duplicates, and exerted himself strenuously to procure for his use such as he possessed no samples of. After having described and figured those fruits of which there were no duplicates, Gærtner left this city, rich in presents from Sir Joseph and the gardens of Kew, and proceeded to Amsterdam on a visit to Thunberg, lately returned from his voyage to Japan and the Cape of Good Hope. That celebrated botanist received him with every demonstration of friendship. He supplied him with a great number of fruits, accompanying them by a promise of forwarding to him at Calw many others which had not yet reached him: so we find, in fact, his presents recorded in almost every page of the work on fruits.

Can any one reflect on this period of Gærtner's life without finding an ample source of satisfaction—without being touched with the confidence and frankness with which he sees him address himself to all those who had it in their power to afford him information concerning the objects of his studies—or without revering the sentiments of those who so unboundedly imparted their treasures? Nor ought this to surprise us. The further we advance among the sciences, the more we become attached to them; and end in loving them for their own sakes, and for the use they are of to mankind. A desire of their advancement grows up into a passion that silences the dictates of selfishness, and we are taught to consider what we possess, as a stock that is common to all who are actuated by the same views. Men of science, and the real friends to knowledge, will never hesitate disinterestedly to communicate all that they

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know, though it may have cost them much pains and labour to acquire. Undoubtedly it is the province of each individual to give to the world his own discoveries, of which he alone can furnish the vouchers and details ; but all insulated facts, useful to labours on a more comprehensive scale, are offered by them without restriction to him who is specially engaged in any such, that he, by combining them with others, may place them in their most advantageous and useful point of view. Most literary strangers have remarked this communicative disposition to exist in a peculiar degree among the French ; and it is plainly proved, by the succours afforded to Gærtner, not to be uncommon among the inhabitants of other countries : yet it is the exclusive privilege of minds of the first order. When we abound in riches, it costs less to be bountiful ; nor has that bounty been ever found to have taken from the fame of those who have so ceded the fruits of their meditations to another's use.

On leaving Amsterdam, Gærtner proceeded to Leyden, where the museum contained many things of consequence to him.. Unfortunately his zeal for study was such, and his desire to avail himself of every moment of time that he might return to his retirement so ardent, that they rendered him but too careless of his health. The frequent use of the microscope, and excess of labour, brought on a nervous disorder that fell on his eyes. He returned to Calw, where he was threatened with the loss of his sight. No remedy afforded him relief. Nor was the vexation at seeing his labours thus interrupted likely to assist the cure of a nervous affection. For twenty months he was confined to his bed in a darkened room. He had submitted himself to his fate with a resignation that was truly philosophic, and had renounced all medical assistance, when his pains gradually ceased. By-and-by his sight returned as perfect as before the attack. While his health was still weak, the
appetite

appetite for study remained so keen that it prevented his being sensible to any pain that did not deprive him of the faculties of observing. He resumed his work with ardour; setting about the drawing and describing his ample collection of fruits with such diligence, that in two years the manuscript and drawings for the first volume were nearly completed.

Nevertheless, before he finally committed it to the press, he determined to revise it. It was then he discovered that the knowledge he had been acquiring during the progress of it, had accustomed him to find relations and observe details that he had suffered to escape him in its commencement. His descriptions appeared to him to be defective in exactness, clearness, and in their analogies not having been sufficiently attended to: he perceived that the introduction at first composed was not free from hypothesis, and boldly resolved to recast the whole. That he might neglect nothing that could contribute to success, he thought it would be well to let some interval intervene between composition and revision, and to dissipate his thoughts by other occupations in order to rid himself of all prejudices in favour of his own system, that he might then scrutinize the work with the same impartiality he would that of an author whose opinions he intended to combat. With this view he suffered eighteen months to elapse without casting a look on it; and whilst able artists engraved his designs, he employed himself in the construction of several pieces of mechanism, among which is a fine astronomical time-piece; in composing a monograph on the plants with compound flowers, of which he reformed the genera, and carefully described such species as he could procure. The extract of this work containing the generic characters, forms the tenth and last centuria, is thrown together at the close of the second volume, and is the completest morsel of the whole. It is to be wished that it were published

entire ; the tribe of plants with compound flowers being the most numerous in the vegetable kingdom, and one of those where the generic distinctions are the least conspicuously characterized. In fact, however easy and simple their division into plants with floscular, semifloscular, and radiate flowers, first established by Tournefort, and since adopted by Gærtner, may be, each of these divisions comprehends a great mass of vegetables ; and the character which separates those with floscular, from those with radiate flowers, is not so constant but that several genera encroach on each other : thus we see in *Bidens*, *Anthemis*, and *Conyza*, that several species sometimes have the radius, and at others are without it.

Linnæus's arrangement of them, according to the sex of their florets and semiflorets, is the most ingenious and refined part of his whole system ; but his genera are sometimes founded upon characters that are neither constant nor easy to be perceived. I have not forgotten that two celebrated philosophers have, since his time, cleared up most of the difficulties that perplexed the study of this tribe, and have reorganized to great advantage its genera ; in doing which they have almost always fallen in with Gærtner, who, on his side, kept close to nature without having any other communication with them.

The engravings being finished, he spent eight months in recasting his first volume, and printed it at Stutgard, on his own account, prefaced by a dedication to the president of the Royal society of London ; it appeared in March 1788.

A work like this soon found its way among botanists ; it placed the science on a new basis, presenting a model of correctness and precision till then unknown. The figures have been successively copied into the various works where plants are described ; and M. Lamarck has made use of some of them to enrich the plates of his "*Illustrationes generum*." About this period the academy of sciences at Paris, having
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to decide which was the work that had of late years afforded the most benefit to the sciences, allotted the second place to Gærtner's, although its merit was then far from being so generally recognised as at present.

Gærtner, though yet at some distance from old age, being at this time not more than fifty-six, was already reduced to a state that demanded cessation from labour. Yet his feebleness, instead of inducing him to spare himself, only served as an incentive to greater exertions: it excited a fear that nature might not allow him time to put a finishing hand to his second volume, the materials for which he had prepared while employed in composing his first. Thus the tired traveller hastens his pace that he may not be surprised by night. Excess of labour, the workings of his mind, joined to a habit of remaining perpetually sitting and confined to his room, which he had not left above ten times since his return from England, tended to aggravate an hæmorrhoidal affection that had long afflicted him. For above a year a slow fever preyed upon his health; yet he seized with avidity all opportunities that its intermission offered, to design and describe such new fruits as he had received from Thunberg; and the copy of his second volume was delivered to the printer in April 1791.

What must be the charm that the study of nature possesses, which is able to make us forget for a time the sufferings of our body? to which we abandon ourselves with the greater eagerness in proportion as we perceive the last hours of our existence advance? that teaches us to value life only in the proportion to the use we make of it? that creates for us out of our labours, and from the hope of rendering ourselves useful, a source of the purest pleasure, depending neither upon health, riches, or the opinion of the world?

It was now the time that Gærtner had a right to consider his task as performed, and to look forward to the en-

joyment of some repose from labour. But as his fame spread, so new materials for his work poured in from all quarters. Could a zeal like his suffer him to forbear from the describing and making them known? In fact, they laid the foundation of a supplement, intended as a third volume: on this he continued to work unremittingly; and the evening before he died, with a feeble trembling hand, he completed the description and drawing of the plant named *HALLERIA lucida*. The sciences were deprived of him on the 14th of July, 1791, at the age of fifty-nine.

It would be superfluous to detain the reader by any further attempt at portraying the character of Gærtner, than that which the recital of his life affords. To what, but to the utmost innocence of habits and simplicity of pleasures, joined to the most steadfast perseverance, can we impute his never desisting from the task of collecting knowledge, solely to assist in its diffusion? during which the idea of increasing his fortune seems never once to have suggested itself to his mind. His opinion was, that no profit, however great, could repay him his loss of time: economy furnished him with the means of defraying the expences of his journeys, of acquiring a considerable collection of books and objects of natural history, as well as of printing his work, the success of which he had no prospect of ever living to witness. His only dissipation consisted in the education of his son, for whom he thought the noblest inheritance he could bequeath was a name respected for the worth of him who had worn it, accompanied by an education that might enable him to pursue a career in which his father had distinguished himself.

The singular modesty that marked his character ought not to pass unnoticed. While he gives in fact a complete system, founded upon the structure of the fruits, he simply offers it as a means of assisting us in the examination of them, and in their arrangement: he confesses, that al-

though there are tribes in which these afford the most definite and stable characters, as, for instance, in the *Palmæ*, *Umbelliferae*, *Cruciferae*, and *Malvaceæ*, there are others in which, by themselves, they are insufficient for that purpose, as in the *Gramina*, *Labiatae*, and *Compositae*. In his preface to the second volume we find a candid exposure of the weakest parts of his work. He shows us what remains to be done, and points out errors that could else have been with difficulty detected; while his apology, drawn from the situation of his health and shortness of his time, are truly affecting.

“I feel,” he says, “how imperfect my work is left; and how was perfection to be looked for from the first essay in a new career? But I console myself with the thought that it will be admitted, on all hands, that I have neglected nothing in my subject, on the side of exactness, and that I have done all that could be fairly expected from an insulated individual, at a distance from all libraries, collections, and botanic gardens. My fortune is extremely confined—yet I have made three expensive journeys to England and Holland to examine fruits; I have since worked without respite for the space of eleven years, during which time I have had to struggle with the cruellest maladies. And still I solemnly declare that I shall hold myself amply recompensed for all my labours, if they are the means of inducing the botanists of Europe to use more exactness and precision in the characters of their genera, and the traveller not to content himself with bringing home imperfect samples of plants, unaccompanied by their fruits, and to bestow an equal attention in exhibiting and describing all their separate parts. Thus will botany reach that point of perfection from which it is still but too distant; but to behold and contribute to which is the chief object of my heart.”

Among the manuscripts that Gærtner has left behind him, there is a work the publication of which must prove
extremely

extremely useful. It is a polyglot dictionary of the names of plants, which he compiled while he resided at Petersburg. He had felt the want of such a work more than any one; often complaining that he received fruits under foreign names, and that he was not able to come at the systematic one which belonged to them. Such a performance required an acquaintance with several languages; and, fortunately, Gærtner had in his younger days, during his various excursions to foreign countries, taken care to accompany the study of general grammar, and the dead languages (which formed a part of his elementary learning), with that of the living ones; in particular of the English, French, Italian, and Russian tongues.

The rest of his papers consist in descriptions of a considerable number of Zoophytes and Mollusca, together with the dissections of some fishes. These his son intends to publish, after retrenching what would be now no longer new or interesting.

As I have asserted that Gærtner has opened a new career in botany, I think I owe it to those who have not made the science their peculiar pursuit, in this place, to offer some general outline of the plan and purport of our author's great work.

Those botanical productions which the ancients have transmitted down to us being devoid of system, it is but too often utterly impossible to recognise the plants they speak of, the uses of which they have pointed out to us. When first the necessity of classing vegetables, in order to distinguish them, began to be felt, every one pursued a method of his own: still not having learnt in what the true value of their different characters consisted, their methods for the most part afforded but little assistance even in the determination of species, and not a shadow of it for the forming of genera. Cæsalpinus was the first who, in 1583, attended to the examination

tion of the organs of fructification. He showed, that as the fruit was the boundary of the vegetable career, the object for which it seemed alone to have existed, as well as the means of its reproduction, so it was likewise the part the least subject to variation, and that in which the most essential character must consequently be contained. He went further : he made dissections of seeds ; he distinguished such as were monocotyledonous from those that were dicotyledonous, under the names of *univalvular* and *bivalvular* seeds ; he remarked the position of the ovary in the relations it bore to the other parts of the flower, as well as the cells and partitions of the fruit, the form and scite of the embryo contained in the seed ; and was enabled from such principles to class, in a method not very wide of nature, the seven hundred and eighty plants he has described.

Nothing excites our wonder more, than that these observations of his should have remained for so long a period without being followed up by any one, or applied to a greater number of plants. Grew and Malpighi, who made many discoveries in vegetable anatomy, bestowed particular attention on the germination of seeds, yet added scarcely any thing to that which Cæsalpinus had advanced on the subject before them.

Tournefort built his system both on the fruit and flower, giving the preference to the last ; not on account of superior importance, but because it was the most conspicuous, and because its form afforded a greater latitude for a combination of differences ; and, in as far as related to the rendering the study of botany more easy, he judged right. . . .

Linnæus neglected the fruit too much ; the consequence has been, that however captivating and ingenious his system may be, we find it perpetually breaking through those affinities that nature has herself established. Jussieu was more sensible of its importance, and has never neglected

lected noticing it, as likewise the embryo and its perisperm; yet he did not extend to its analysis all that scrupulous precision that was requisite. How was it possible, indeed, that he could have given the necessary attention to such details, without losing sight of the widely extended and general design of such a work? There existed besides, at that time, scarcely any source to which he could recur for assistance in that department. Travellers had in general returned with herbariums in which scarce a fruit was to be found; and were often ignorant to what plants those belonged that they might have happened to procure and bring home; whence our collections abounded in unknown fruits. Rumph, Kæmpfer, and Rheede, were almost the only writers who had given us in their works any descriptions or pretty accurate figures of fruits, the engravings of most other botanical books seldom exhibiting any in a state of maturity. Such was the situation of this portion of botany when Gærtner undertook his work.

In an introduction intended to bring us acquainted with the parts of fructification (to which he has devoted half the first volume, and added fresh matter placed in several new points of view in the preface to the second), he treats of the several modes of vegetable propagation, with the differences that distinguish buds, bulbs, tubercles, &c., from seeds; a subject that he has handled in a manner entirely original; discriminating with the utmost clearness those tribes of vegetables which are furnished with true seed, from those which, like the mushrooms, sea and fresh water weeds, &c., multiply by eyes and a kind of viviparous evolution. He passes on to the organs of fructification; detailing all the circumstances which accompany that phenomenon, with the changes that take place in the ovarium from the moment that it has received the first spark of life from the pollen: he then proceeds to show the distinctions between the different kinds of fruits, their coverings, their receptacle

receptacle, and their seeds, till he comes to details which had been before too lightly passed over: here he presents us with dissections of the seeds; analyses their tunics or proper coverings; the cicatrix, or hilum; the embryo; the albumen, or perisperm*; the vitellus, another of their adventitious parts; the chalaza, or point at which the umbilical cord enters the interior of the seed; the cotyledons; the plumula, or feather; and the radicle. He points out their form, their situation, the nature of these different parts, the characters they afford, and the respective value to be set on each, concluding with a methodical arrangement of vegetables according to the fruit; a mode of arrangement which he professedly intended for the sole use of carpology, and by no means to be applied to any general system of plants; but which, after all, with the exception

* *Cæsalpinus* (de Plantis, lib. i. p. 12.) had pointed out this important part of the seed. Grew is the first that has discriminated it with clearness, giving it the name of *albumen*, which Gærtner has retained. Malpighi, Adanson, Gleichen, Böhmer, Méésius, have all spoken of it under different denominations. Jussieu has described the nature and situation of it in a paper on the ranunculus tribe (Mem. de l'Acad. des Scienc. an 1773). He afterwards made most material use of it in referring numbers of plants to their different tribes, and gave it the name of *perisperm*, because in the dicotyledonous plants, which are furnished with it, this commonly surrounds the embryo: thus we see that albumen and perisperm are synonymous terms. Linnæus has formally denied the existence of an albumen in seeds (Vid. Amœn. Acad. tom. i. p. 344. et tom. ii. p. 297.): is it not likely that this arose from his not perceiving the least analogy between that farinaceous or hornlike substance and the white of an egg to which Grew has compared it? One has no idea else how a part that is found in nearly two-thirds of all seeds, and the volume of which frequently exceeds a hundred times that of the embryo, could have escaped such an observer. Whatever the cause might have been, the fact is that he has not mentioned it, and has confounded it with the cotyledons. Nor should I forget to warn the reader that Linnæus separates by name the embryo from the cotyledons, but that it is best to give the name of *embryo* to the cotyledons, plumula, and radicle united, as Gærtner and Jussieu have done: the latter making use of the word *corculum* instead of that of embryo.

of some few anomalies, keeps tolerably close in with natural affinity.

In the first instance he divides all vegetables into such as have acotyledonous, monocotyledonous, dicotyledonous, or polycotyledonous seeds ; at the same time acknowledging that the last division is not natural, and can only be used in classing fruits, as it contains but a very small number of plants (only five genera), which in all other respects agree with such as are dicotyledonous. But he ought at once to have suppressed it, and to have treated these supposed polycotyledons as so many dicotyledons whose lobes were notched, as he has in fact done in his description of *Lepidium* : but the ingenious discovery of Desfontaines, concerning the structures of those plants that have only one cotyledon and those that have two, had not yet been made known. It would have saved Gærtner from more than one mistake ; such as the arranging of the seeds of which one lobe is obliterated, or scarcely perceptible, among the monocotyledonous ones ; a proof that if general theories can only result from a series of detailed observations, yet, when once solidly established, they in their turn likewise assist and direct the observer.

For his subdivisions of the monocotyledons, Gærtner makes use of the inferior and superior position of the ovary or germen ; the presence or absence of an albumen ; and the scite of the radicle. For those of the dicotyledons he further takes into account the number of ovaries ; the having or not having a pericarp ; the nature of that ; the number of cells ; the receptacle ; and the form of the embryo. Such characters, in addition to those which the other parts of the fructification afford, furnish him the means of constructing his genera with precision, to allot their true places to several species that were before ambiguous, as well as to determine with greater certainty the links that connect the genera of different tribes.

In

In taking a general view of the state of the science, he points out what seems to him to be thoroughly understood, and what still ought to form a subject for the researches of the botanist. He dwells upon the impracticability of ever making the natural method fall in with any system built on the assumed pre-eminence of a single part. He asserts that vegetables do not form a continued sequence or series, and are not strung in rows, but that their real arrangement is in different groupes, presenting the appearance of a geographical map, where countries of various dimensions are seen to bound each other, while islands and islets are perceived separated from the whole by seas of various space.

He concludes with some instructions on the mode of preserving seeds, and upon the precautions that are to be used in analysing and distinguishing their component parts; which is not a very easy matter, especially when the seeds are very small, as in poppies, the different species of tobacco, the orchideous plants*, &c.

This

* I think it will be serviceable to make generally known the method to be used in dissecting seeds, and to add to what Gærtner has said on that subject some further information for which I am indebted to his son.

If the fruit is dried, it must first be soaked for some time in tepid water, to soften and plump up the pericarp, that the nature of it may be discovered; the seeds are to be then taken out and thrown again into the water. If they are unripe ones, they float; if ripe, sink to the bottom. This is a singular fact, applying to all seeds, from the cocoa-nut to the dust-like seed of orchis. When the kernel is contained in a hard bone-like shell, this must be broken that the water may penetrate to it. They are then to be stript of their integuments with a sharp penknife; afterwards left to soak some hours longer, when one is taken out and cut crosswise. If we find a cleft extending itself from one edge of the section to the other, the seed is dicotyledonous, has no perisperm, and then easily examined. If we find that it is not thus cloven, a perisperm exists, and the place where the embryo lies is to be searched for; which is to be done by removing the perisperm in thin slices till the embryo is perceived. This discovers itself by a greenish tinge, comes away easily, and falls to the bottom of the water.

H

This first part of Gærtner's work is the result of a life entirely devoted to observation, and deserves to be attentively studied by all those who intend to apply themselves to the physiology of vegetables. It is less read than the second;

If the seed is too minute to make such sections, it must be moistened with oil of turpentine. This generally penetrates the perisperm, especially when it is not mealy, rendering it transparent, while the embryo remains opaque. The seed is then placed under a magnifying-glass or microscope, and all its parts are distinctly perceived.

There are some seeds that are gelatinous; a circumstance which makes the examination of them an operation of considerable difficulty: such are to be put into spirits of wine; where this kind of perisperm becomes hardened and solid. The same method serves also to give consistence to certain pericarps, where it is wished to observe the mode by which their seeds are attached to them. Thus the berries of *Stratiotes* and *Calla æthiopica*, naturally as transparent as the vitreous humour of the eye, become as opaque as the boiled white of an egg, when they have been soaked in spirits of wine, resuming their original transparency when plunged again in water. In general, where the embryo, vitellus, and perisperm are of one colour, they show themselves distinctly enough from each other after the seed has been soaked in essence of turpentine or spirits of wine, as the action of these menstrua is different in each different part. A little use will soon point out the process that is best adapted to each distinct case.

A word more upon the precautions to be used by travellers that collect fruits, either for their own observation or as presents for the naturalist.

The fruit should be picked when quite ripe. If their pericarp is very large and fleshy, the best way is to preserve one in spirits, and then take away this too bulky part from the others, in order to dry the seeds or stones more perfectly. These seeds should be folded in little bags or pieces of paper with a bit of camphor; which does not indeed kill insects, but according to Gærtner keeps them off. If camphor cannot be had, sulphur may be used instead of it. It will be proper to enclose the first paper in a second wrapper of the same, that has been oiled, to prevent their coming in contact with the air. Fourcroy pointed out to me a process that is still more secure. Some unsized paper should be soaked in a solution of tan: when the paper is well saturated with this, it is to be dried; and bags, the seams of which are to be well secured, made of it to hold the fruit. The insects do not eat holes in paper thus prepared.

The ripe fruit should be always accompanied by flowers with impregnated ovaries, that the number of their cells may be ascertained. It is well known that in many pericarps with several embryos, one seed only comes

second, because it can only be understood by those already skilled in botany. It might be perhaps to be wished that our author had been somewhat fuller and more circumstantial in the developement of his principles. But he did not intend his work for the use of beginners; he took for granted that the examples he quotes, the analogies he refers to, are already known to his readers, and omits to illustrate by figures, details which he himself comprehended at first sight. After all, as his ideas are always well digested, and his opinions supported by numerous proofs, we are sure to understand him if we give ourselves the trouble to read him attentively.

The second part contains 1050 genera. Of these, which were more than half of such as had been then published, fifty were entirely unknown. About the same number is made up by the detaching of those species from each other as, in his opinion, were too distinct to be contained in the same genus. The characters are taken from all the parts of fructification; the fruits are analysed and described with the greatest attention to exactness; the figures designed with the greatest pains, and often exhibit several species of the same genus; the fruit only is shown, except in some few new genera. The tribes of palms, umbelliferous and cruciferous plants, are those in which the greatest reform and innovation will be found, as was to be expected where the genera admit of no other solid basis than that procured from the fruit. The second volume is a superior performance to the first, its views being more extended, and the affinities pointed out truer and better defined; owing to its completion being subsequent to the appearance of

to perfection, often effacing every vestige of the others, as in the oak, lime, &c. Nor can we be always sure, from a mere inspection of the fruit, whether the ovary is superior or inferior; a circumstance that has often led to very material errors.

Jussieu's work, in which Gærtner found many new lights. He often quotes him*.

Notwithstanding Gærtner had, since his return home, constantly confined himself to his closet, and made the dissection of fruits his principal study, yet we must not suppose that he always contented himself with only what he found in books, as to what concerns the other parts of fructification. Before he undertook this his last work, he had long studied living plants; and in several genera he describes the flower after his own remarks. He has hardly ever omitted to compare the ovary or germen with the ripe fruit; on which head we owe to him some important amendments, made not merely from herbariums, and in exotic vegetation, but in the instance of plants known from time immemorial among the botanists of Europe. I shall only offer one example. Till his time the genera of the oak, beech, and sweet-chesnut, had been described from appearances that were not real; they were supposed to have an inferior calyx, containing one or more fruits with a single cell. He has demonstrated that what was taken for a perianth is in fact an involucre; that the real calyx crowned the ovary, which in the oak and beech had three cells, containing each two seeds in embryo, and in the sweet-chesnut six cells, which therefore ought to be separated from the beech, not only on this account, but also because the fertile flowers are hermaphrodite, and not simply female. The hazle-nut, hornbeam, and liquid amber, are made the subjects of the same reformation, while the

* Jussieu having received the first volume of the work on fruits, just as they had done printing his "*Genera Plantarum*," he added a note in which he refers to his genera all those that Gærtner had established under other names. The agreement we find in the observations of these botanists, and the conformity in the principles by which they appreciate the value of the characters, show incontestably that they have both followed the road pointed out by nature.

connection of these genera with each other is improved and strengthened by it.

Our author has left drawings and descriptions of fifty genera, which are to be placed at the head of a supplementary volume, on which his son is now at work, and the publication of which must be looked forward to with pleasure by all botanists.

III. *Observations on the Genus Scilla, from the German** of Count HOFFMANNSEGG and Professor LINK.

THE name of *SCILLA* has been applied, as far back as the times of Theophrastus, Dioscorides, and Pliny, to a plant which, by the later commentators of these authors, is thought to be the same with that which is now called *Scilla maritima*. This plant has retained its name in the shops; and before Tournefort, no botanist ventured to deviate from the received terminology. Morison† says, that in his opinion *Scilla* could not be distinguished from other kindred genera, but by its large succulent root. The remaining species of the Linnean genus *Scilla* were incorporated with *Hyacinthus*, because they are in reality nearly related to *Hyacinthus non scriptus*, which, as the true *Hyacinthus* of the ancients, could not be deprived of its name. There are instances enough in botany where the too scrupulous adherence to established names has been very prejudicial to the progress of the science. Tournefort was the first who ventured from the beaten track, and, uniting the two genera *Scilla* and *Ornithogalum*, took the first step towards a better arrangement of their species; yet still he separated *Scilla*

* Der Gesellschaft naturforschender Freunde zu Berlin neue Schriften, vol. iv. 1803.

† Historia Plantarum, P. ii. p. 395.

Lilio-Hyacinthus from the other species, on account of its bulb being scaly and resembling that of a lily.

Linnaeus, who was often successfully guided by the habit of plants, soon discovered the difference that subsisted between *Scilla* and *Ornithogalum*; he separated the species (with the exception of *Scilla unifolia*) with some success, but was rather unfortunate in regard to the distinguishing characters which he attributed to both genera. According to him, *Scilla* has "filamenta filiformia;" *Ornithogalum*, on the contrary, "filamenta basi dilatata:" but the inspection of the flowers of a very few species of *Scilla* will prove the insufficiency of that character. Besides this, we find "corolla patens" attributed to *Scilla*, while the corolla of *Ornithogalum* is said to be "supra medium patens:" on comparing, however, different species of *Ornithogalum*, as for instance, *O. luteum*, or *minimum*, with *Scilla amoena*, the difference in this respect will be found very trifling. As for the last character, "corolla persistens" of *Ornithogalum*, and "corolla decidua" in *Scilla*, it certainly comes nearest to the point; but Dr. Smith* justly observes, that the corolla of *Scilla peruviana*, and of other species, is not deciduous. Desfontaines† says of *Scilla*, "filamenta æqualiter basi dilatata;" of *Ornithogalum*, "filamenta alterna latiora;" to which it may be objected, that all species of the latter genus have not their stamens alternately broader. Lamarck‡ again unites *Ornithogalum* and *Scilla*.

The species of *Scilla* may, however, be distinguished from those of *Ornithogalum* by the particular tenderness of their flowers; but this character, independently of its requiring a comparative examination of several species, is not sufficiently clear, on account of the insensible gradation with regard to that quality: if therefore we wish to preserve it as a character, it must be rendered less ambi-

* Flora Britannica, vol. i. p. 367.

† Flora Atlantica, vol. i. p. 297.

‡ Flore Française, 2d ed. tom. iii. p. 862.

guous and vague; and this may perhaps be done more effectually by attending to the nature of the petals. The species of the genus *Scilla* have petals with a longitudinal nerve running along their middle, with very minute and scarcely visible accessory nerves; the segments in *Ornithogalum*, on the other hand, are furnished with several pretty strong nerves adjoining each other, and their lower surface is commonly green,—a circumstance never observed in *Scilla*. If, however, this character should be thought too vague or minute, all that remains to be done is to unite *Scilla* and *Ornithogalum*; and in this case it might be very convenient to form subdivisions from the colour of the flowers.

The genus *Scilla* is likewise nearly related to that of *Hyacinthus*: I find no other difference than that the flower of *Scilla* is separated down to the base, which is not the case in *Hyacinthus*: and this character appears to me so safe and obvious, that I do not hesitate to unite some species of *Hyacinthus* with those of *Scilla*. According to what has been premised, the species of *Scilla* known to us are the following;

1. *SCILLA maritima*, Linn. Sp. Pl. ed. Willd. vol. ii. p. 125.
Folia late lanceolata, post florescentiam enata. Racemus longissimus. Bracteæ lineares, pedicellis triplo brevioribus, subtus basi breviter calcaratæ. Petala patentia alba, nervo rubro.

The epithet of *refractæ*, which Linnæus has given to the bractes of this species, is not quite correct: they should at least be called *infractæ*; for the base is bent back to the stem, while its upper and larger part is again bent upwards. This plant approaches very near to *Ornithogalum*.

It grows abundantly on barren hills in Spain and Portugal, and flowers in the months of July and August. The name *maritima* is not quite proper: for the plant is seldom met with near the sea-shore, and sometimes very remote

from it; as for instance, at the foot of the Estrella mountains, which are at about 100 miles distance from the sea.

2. *SCILLA Lilio-narcissus*. Spéc. Pl. l. c. p. 126.

3. *SCILLA italica*. Sp. Pl. l. c. Folia plura linearia. Racemus oblongus, multiflorus (florum 20 et ultra). Bracteæ binæ, altera longitudine fere pedicelli, aut longior. Germen sphæricum. Antheræ polline cœruleo.

This species is not unfrequent in the gardens, and easily known by the grayish-blue colour of its small flowers.

4. *SCILLA vincentina*. Folia plura linearia. Racemus pauciflorus (florum 5—6). Bracteæ binæ, altera pedicello subæqualis. Germen oblongum. Antheræ polline flavo.

A small plant, which we often met with on the barren hills round Cape St. Vincent, in Portugal, where it flowers in February.

Bulb solid. Root-sheath scariose, obtuse, with a short point. Leaves radical, 2—3 lines broad, acute, somewhat longer or shorter than the scape. Scape upright, round, even, smooth, 2—3 inches long. Raceme with few (5—6) remote flowers. Bractes two at the base of each pedicle; the one 2—4 lines long, lance-shaped; the other twice shorter, linear; both blueish. Pedicles nearly the length of the larger bracte, spreading. Corolla patent; segments lanceolate, equal, acute, one-nerved, blue, 2—3 lines long. Filaments tapering above, widening below, alternately adnate to the segments. Anthers incumbent, versatile (*libratæ*), blue; pollen yellow. Germen oblong, continued by a style rather longer than the filaments.

This species is distinct from *Scilla italica* by the smaller number of flowers, their difference of size, dark blue colour, oblong germen and yellow pollen.

5. *SCILLA umbellata*. Ramond in "Bulletin des Sc. No. 4."

Approaches to the former; but the inflorescence is completely umbellate.

6. *SCILLA*

6. *SCILLA tetraphylla*. Sp. Pl. l. c.

7. *SCILLA peruviana*. Sp. Pl. p. 127. Folia late linearia. Racemus multiflorus, floribus confertis subcorymbosis. Bractea solitaria pedicellis elongatis duplo brevior. Corolla patula.

Grows abundantly on the grassy hills round Cintra, in the neighbourhood of Lisbon. From whence it probably found its way into the gardens; where, at first, it was considered as an American plant.

8. *SCILLA japonica*. Sp. Pl. l. c.

9. *SCILLA amœna*. Sp. Pl. l. c. Pedicelli flore breviores, aut ipsi æquales, longe distantes.

10. *SCILLA campanulata*. Sp. Pl. p. 128. Folia late linearia, plura radicalia. Racemus multiflorus, floribus distantibus. Corolla petalis (segmentis) arrectis cœruleis subnutans. Bracteæ binæ, altera pedicello initio subæqualis demum brevior. Filamenta alternatim petalis ultra medium adnata.

Of this species there are two varieties in Portugal; one with large flowers, which grows abundantly on the hills near Bellas, in the neighbourhood of Lisbon; another with smaller flowers, very common on the hills of Algarve.

11. *SCILLA non scripta*. Hyacinthus non scriptus. Sp. Pl. l. c. p. 166. *Scilla nutans*. Smith Fl. Brit. vol. i. p. 366. Folia late linearia radicalia plura. Racemus multiflorus, floribus non confertis. Bracteæ binæ pedicello multo longiores. Corolla nutans, petalis arrectis cœruleis. Filamenta petalis ultra medium adnatis.

This species approaches so near to the last, that it is a matter of difficulty to distinguish them properly; both are therefore either *Scillæ* or *Hyacinthi*, and cannot be separated.

12. *SCILLA cernua*. Hyacinthus cernuus. Sp. Pl. l. c.

p. 167. Folia late linearia, radicalia plura. Racemus multiflorus, floribus non confertis. Bracteæ binæ pedicello multo longiores. Corolla cernua, petalis (segmentis) arrectis rubicundis. Filamenta alternatim ultra medium adnata.

This plant is nearly akin to the foregoing, but may be known from it at once by the colour of its flowers being constantly red.

13. *SCILLA bifolia*. Sp. Pl. l. c. p. 128. Folia late linearia et caulina. Racemus multiflorus, floribus non confertis. Bracteæ nullæ. Corolla patula.

14. *SCILLA verna*. Sp. Pl. l. c. p. 129.

15. *SCILLA lusitanica*. Sp. Pl. l. c.

We have not been able to find a species in Portugal that any ways corresponds with the Linnean description. Not any of the Portuguese species have “flores distantes petiolo fere breviores.” Rudbeck’s figure neither completely agrees with the description of Linnæus, nor with any species in Portugal, unless it be with No. 17. that follows. The synonym of Bauhin belongs to *Scilla italica*, for he refers to *Hyacinthus stellatus italicus* Besl. Eyst., which certainly is *Scilla italica*. Neither does M. Brotero, professor of botany at Coimbra, know of any plant that can be the *Scilla lusitanica* of Linnæus.

16. *SCILLA monophyllos*. Folium unicum, rarissime duo, lanceolatum. Racemus multiflorus, floribus confertis. Bractea solitaria, demum pedicello brevior. Corolla patula.

A pretty plant, growing plentifully about Lisbon, especially in the heaths on the other side of the Tagus; hitherto undescribed.

Bulb solid. Leaf solitary, radical, wide, lanceolate, boat-shaped, acute, much shorter than the scape. Scape upright, somewhat compressed, even, smooth, 4—6 inches long.

long. Raceme of 6—20 flowers, at last crowded, approaching to a corymb. Lower pedicles an inch or more long, erect. Bracte wide at the base, attenuated, white, at the end shorter than the pedicle. Corolla small as in *Scilla italica*, spreading, blueish. Filaments widening at the base, connate with the lower part of the corolla, shorter than the petals. Germen almost globular. Style longer than the filaments.

Sometimes the flower of this species is of a pure white. It helps to ornament the beautiful heaths of Portugal in the months of February and March.

17. *SCILLA odorata*. Folia anguste linearia radicalia plura. Racemus multiflorus, floribus confertis. Bractea solitaria pedicello demum brevior. Corolla subpatula cœrulea.

This plant has never been described, but comes near to Rudbeck's figure of *Scilla lusitanica*. Its elegant sweet-scented flowers adorn, in February and May, all the hills of Algarve.

Bulb solid. Root-sheath radical, disappearing. Leaves radical, many, narrow, somewhat channelled, mostly shorter than the scape. Scape half or one foot long, ascending, round, even, smooth. Raceme of 10—20 crowded flowers; lower pedicles rather longer than the upper, of 5—6 lines. Bracte at the base of each pedicle, generally longer afterwards shorter than the pedicle, blueish. Corolla rather patulous, three or four parts of an inch long; petals lanceolate, blue. Filaments widened, connate at the base with the petals. Anthers blue. Germen globular. Style same length with the stamens.

18. *SCILLA orientalis*. Sp. Pl. l. c.

19. *SCILLA hyacinthoides*. Sp. Pl. l. c. p. 130. Bulbus tomento viscoso tectus. Folia radicalia latissime lanceolata.

lata. Racemus longissimus, pedicellis confertis elongatis. Bracteæ minimæ. Corollæ patulæ.

This species is found wild not only in Madeira but likewise in Portugal. Perhaps it was introduced from thence into the gardens, like *Scilla peruviana*, and was afterwards supposed to be an oriental plant. It grows near Lisbon on the hills beyond Alcantara, which display the gayest vegetation, and well deserve the appellation of *Hortus Dei*, given to similar hills in the neighbourhood of Montpellier.

20. *SCILLA autumnalis*. Sp. Pl. l. c. Folia anguste linearia, post florescentiam enata. Racemus submultiflorus, floribus subcorymbosis. Bracteæ nullæ. Corolla parva, petalis ovalibus cœruleis.

That this species is without leaves during the time of flowering, is a fact not noticed by authors.

21. *SCILLA unifolia*. Sp. Pl. l. c. 131. is an *Ornithogalum*. The flower is white, and shows, to a great degree, all the habit of that of an *Ornithogalum*. This plant grows abundantly in Portugal.

22. *SCILLA lingulata*. Desfont. Fl. atlant. vol. i. p. 298. tab. 85. fig. 1. Approaches very near to *Scilla vinctina*; but is furnished with single bractes.

23. *SCILLA villosa*. Desfont. l. c. p. 299. tab. 85. fig. 1. Approaches near to *Scilla odorata*, which, however, has not villous leaves.

24. *SCILLA obtusifolia*. Desfont. l. c. t. 86.

25. *SCILLA parviflora*. Desfont. l. c. p. 300. t. 87.

26. *SCILLA undulata*. Desfont. l. c. t. 88.

27. *SCILLA anthericoides*. Desfont. l. c. p. 301. According to the structure of the flower this plant is, as well as *Scilla unifolia*, to be united with *Ornithogalum*.

IV. *On the probable Mode of Fructification peculiar to Ferns,*
from the German of J. J. BERNHARDI.*

BOTANISTS have frequently persuaded themselves that they had discovered the sexual parts in ferns ; and many are the acute observers who have laboured to detect and expose the secrets of the fructification of these vegetables : yet we have still to regret that, at the commencement of the present century, we know as little on this subject as we did at that of the last.

Since the ferns are known to possess real seeds, as well as germs†, it is not to be wondered at that naturalists should have suspected that they were furnished with sexual parts, nor that some should have thought they had really discovered them.

It would be superfluous to detail, in this place, all the various opinions entertained concerning the mode how and when these their sexual parts perform their functions ; most of them have been sufficiently known, and are now become obsolete : I shall therefore only observe on one of the latest, which is that of Hedwig. The theory of this naturalist will appear to possess no weight, when we know that the pedunculated globules, which he takes for the male parts, are sometimes found on the upper and sometimes on the lower surface, or on both at once ; that they are frequently not found at all ; that they are in every respect like the

* Schrader's Journal für die botanik, vol. v. 1802.

† Instances are *Asplenium bulbiferum*, *Cyathea bulbifera*, &c.; but the most remarkable fern of this kind I received through the kindness of Professor Sprengel, under the name of *Asplenium ramosum*. In this the germs situate on the upper surface are developed whilst still fixed to the mother-plant, and shoot out into considerable leaves. The same plant is also remarkable in another point of view : it belongs to the division of *Cænopteræ*, but differs from the other species by its episporangia being rather remote from the margin of the leaf.

pedunculated

pedunculated globules to be met with on the leaves of other plants; that the ovaries, moreover, of most of the ferns, at the time when the process of fecundation is said to take place, are covered with a membrane in various manners, and in none of them has a stigma been discovered: finally, that, contrary to what we observe in all other plants and animals, fructification must take place at an early period, when neither the rudiment of the fruit, nor even the leaf* itself, is yet completely developed, &c.

It was chiefly by the ill success which had attended most of the investigations of the sexual parts of these vegetables, that Gærtner was led to broach again the obsolete doctrine of Aphrodites, which was welcomed with applause, though it should seem that neither he nor his followers have attached any distinct idea to it. Thus this naturalist, in his immortal work †, says: “Alii feminea organa ipsa sibi sola sufficere, mascula autem adeo clancule istis addita, eorundemque fabrica intertexta esse volunt, ut hæc integrantem duntaxat priorum efficiant partem, nec a feminei uteri compage ullo modo distincta sunt.”—In another place ‡, speaking of the same plants, he says: “Cum autem verum adest semen, sed inconspicuo et quasi potentiali saltem embryone dotatum; adest quoque merus apparatus femineus et mascula organa, certe pollen et antheræ conspicî nequeunt.”—In Borkhausen’s Botanical Dictionary we find the following passage: “Aphrodites are such plants as

* Dr. Bernhardt rejects the term of *frond* for denoting the leaves of the ferns. “Folia filicum,” he says elsewhere, “frondes vocantur; cum vero in partibus plantarum denominandis, terminis superfluis et æquivocis nil sit deterius, vocem rejicere cogor. Etenim si sub eo omne folium, partes fructificantes gerens, concipio, palmarum folia frondis denominationem respuere, *Ruscorum* contra, *Phyllanthorum*, aliarumque plantarum folia eam petere, quis negabit? Cur vero his foliis nomen attribuendum sit peculiare, alia deest ratio.” TRANSL.

† De fructibus et seminibus plantarum, tom. i. p. xxxi.

‡ Ibid. p. xxxviii.

produce indeed true seeds, and consequently attest the previous cooperation of male and female organs ; but these are not here found separate, nor of course is any external cooperation perceptible : but male and female powers, in these vegetables, are concentrated in the same organ, in such a manner that it is enabled to produce the egg of the female as well as the seminal liquid of the male requisite for its fecundation ; so that the secretion of the sperma, and the impregnation of the egg, take place within the uterus itself."

Now what do we learn from all this ? In the first passage the male organs of generation, though clandestine, are yet allowed to exist together with the female organs. According to the second, there wants *nothing* but *pollen* and *anthers* ; the *rest* (?) of the male organs may perhaps exist. From the third description we learn that there are male and female organs though united ; further on they appear to be converted into one organ ; but at the conclusion they separate again, and the egg is impregnated within the uterus. I must confess, that the more I have read of Aphrodites, the more eccentric has their existence appeared to me. I am of opinion, that if the secretion of the male and female fructifying liquids be admitted, there must exist two distinct organs for that secretion, however curiously concealed they may be. If both are secreted within the uterus, it must follow that there also both the organs are situated ; but in this case I ask, can this part continue to be called *Uterus* ? But if we are not inclined to assent to what is elsewhere insinuated by Gærtner*, viz. that in the seed-vessels of the ferns (nearly as in *Marsilea* and *Pilularia*) both male and

* Ergo non alius idoneus spermatis officinæ suppetere potest locus, quam qui intra ipsam ovarii compagem positus sit. Atque hanc, quam ratio indigitat, ipsa quoque experientia confirmat genituræ scaturiginem, nam in *Pilularia* atque *Marsilea* papillulas fecundantes intra ovarium Jussieu in-
dustria detexit, &c. l. c. p. xxxvii.

female organs exist, though as yet undiscovered, and that the seed-vessels are in no ways analogous to the uterus: it is still more against the principles of sound philosophy, to admit the existence of such beings as Aphrodites. With regard to these *Quasisperma* and *Quasispore*, we may apply what Cicero has said: "Corpus quid sit intelligo, *quasi-corpus* quid sit, nullo prosum modo intelligo."—All therefore I found I had to do in this case, was to examine whether there were male and female organs within the seed-vessels of the ferns, or not; and I confess that the strictest investigation offered nothing to me but the rudiments of future seeds.

I shall now submit my opinion, which to me appears at least more plausible than the others. For the sake of perspicuity, I shall confine myself at first to one species in describing what I take to be their sexual parts, viz. to *POLYPODIUM aureum* L., the plant in which I made my discovery.

On carefully examining the upper surface of the leaves of this fern, it appears that the vessels form a net, some of the meshes of which are incomplete, the veins running out into straight lines, considerably thickened at their extremities. These thick points are disposed in two or three pairs of straightish rows; the middle pair, which is also the strongest, is about the middle of the leaf; and just opposite to this, on the other surface, we find the seed-capsules. The last row runs down near the margin of the leaf; but the lower surface, opposite to it, affords neither capsules nor any other parts that attract our notice.

While the leaf is not completely developed, the thickened points at the extremities of the vessels are inconsiderable, but by degrees they become more and more conspicuous; their colour, which at first (especially when the leaf is directed towards the light) is a bright yellowish green, becomes gradually paler, and at last turns to white: in this

last stage they are but slightly attached to the surface of the leaf; and when the latter begins to decay, they drop off, one after the other, having assumed the appearance of a fine white pellicle. But before this takes place a considerable magnifying power will discover, on the pellicles near the margin of the leaf, little round bodies of a brownish yellow hue, situated singly in several small cavities of these pellicles. Some care is, however, required, to watch the precise period at which these bodies are developed, otherwise the observer will often find nothing on the pellicles but the cavities before occupied by the round bodies; or at most a few small particles of a brownish colour quite dried up. As to the inner row, the same takes place in regard to the generation and fall of the pellicles; these however are not furnished with cavities containing globules similar to those above mentioned, instead of which there sometimes appear on the surface some dried-up brownish globules.

In consequence of these observations I am inclined to consider the small round bodies in the pellicles on the margin of the leaves as pollen*, and the pellicles in the middle as stigmas. It is true, I do not pretend to prove this by a series of experiments, the difficulty of which is obvious; yet analogy is greatly in favour of my opinion. To the objection which may be started by some, viz. that these supposed sexual parts are so very different, both in form and situation, from those of other vegetables; it will be scarcely necessary to oppose any thing further than that it is more than probable that a family of plants, so singular in their whole appearance, should also differ in their parts of fructification.—But besides this I have the following reasons to offer:

The vessels which lead to these parts are considerable,

* To denote these pellicles I propose the term *Hypospermatocystidium*. [Dr. Bernhardt will perhaps feel the propriety of substituting for this another term that requires less time to pronounce. T.A.]

and

and increase in size as they approach them: whence we have a right to infer that these parts are by no means unimportant. Now as at the inner row of vessels we clearly distinguish the female parts, is it probable that the outer should exist for no purpose? Again, is it less probable that the latter should convey nourishment to the male, than that the other should to the female organs?—There is the less reason to doubt this, since we observe in other plants, that the male and female organs, if separated from each other, are still generally situate at correspondent places, and that their integuments are constructed in a similar manner. Thus, if in most of the *Rusci* the female flowers are placed on the upper surface of the leaflets*, we find the male organs in the same position, and strikingly similar to them; if the former are situate in the mosses, in the axils of the leaves, or at the top of the stalk, the latter will be found disposed in the same manner, and enclosed by similar involucre. But this requires no further proof; it is what we find almost throughout the organized part of the creation. Independently of other objections, Hedwig's theory concerning the fructification of ferns loses much of its speciousness from the supposed male organs not being connected with any considerable vessels, and by their occupying places so very indeterminate, and so very different from those occupied by the female organs.

Another proof in support of my opinion may be derived from the œconomy of these parts. The male organs, after the leaves have attained their full growth, shew themselves at the same period with the female. When the globules, which are the naked pollen of these vegetables, are come to perfection, a moisture is observed on the inner pellicle or

* Botanists are mistaken in ascribing to the *Rusci* a stalk and simple leaves; for these plants have only compound leaves and no stalk. *Ruscus aculeatus*, *R. hypoglossum*, *R. hypophyllum* bear their flowers on the leaflets; *R. racemosus* on the leaves.

stigma. As soon as fecundation has taken place, both sorts of pellicles fade, and at last drop off, as stigma and anthers do in other plants. The ovarium, on the other hand, from this time swells more and more, and at last ripens into true fruit. Fecundation appears to be effected as follows : the grains of pollen being easily detached (by any external motion) from their cavities, roll along the surface of the leaf, and attach themselves to the stigmas, which are somewhat prominent; on these they discharge their fertilizing liquid, which unites with that from the female organ*.

Hence we see that here fecundation takes place on the upper surface of the leaves, while the fruit is perfected on the under. The completion of the first process naturally presupposes the assistance of vessels connecting the stigma with the ovarium; and, in truth, we do observe small ones, that cross the substance of the frond from the upper surface, and become pedicles of the ovaries on the under. These pedicles are therefore the real styles of ferns; and the articulated rings, which surround the ovaries, may be considered as a continuation of them.

Yet though the form, situation, and the whole œconomy of these parts bespeak them organs of generation, their use might still remain problematical, were they likewise found on those plants in which fructification is effected by parts already known to be the sexual ones; and my proposition would be still more weakened, if other spe-

* It is more than probable, that the violent explosion of the pollen under water is contrary to nature, and that impregnation is effected rather by means of a gentle flowing of the liquid from the surface of the globules; for, when these latter are in a state of perfect maturity, they will not explode even under the water. Nor have I ever seen any thing like an explosion in the globules of the ferns under water, though I continued my observation for several hours: on the stigmas I often observed them completely dried up.

cies of ferns should be found destitute of them. Hence two important queries remain to be answered :

1. Are such parts found in other species of ferns?—and
2. Are they observed in vegetables in which we know the process of fructification is performed by different organs?

All depends on being able to answer the first in the affirmative, the second in the negative. For the first, let us examine the principal genera of ferns.

ACROSTICHUM.—In *A. Calomelas* and *A. trifoliatum* the male pellicles can easily be observed along the margin of the leaves. I think too that I have seen, on the lower surface, those points representing stigmas; but as I had only an opportunity of examining these plants in a dried state, they did not show themselves distinctly.

POLYPODIUM.—In the species of this genus the sexual organs appear peculiarly distinct. Besides the above-mentioned *P. aureum*, they are very obvious in the indigenous *P. vulgare**; and equally distinct in *P. pustulatum* and *P. scandens* of Forster, two species perhaps not essentially different. In these the male parts form the outer and inner row, the middle row being formed of the stigmas, which are surrounded by an elevated part of the leaf. I might likewise mention in this place *P. latifolium* and *P. tenellum* Forst., were it not doubtful whether they really belong to the genus; for, unless such species can be observed in their earliest stages, this must ever remain matter of doubt†.

ONOCLEA.

* In this species the stigmas are already pointed out by Gleichen. It is indeed surprising, that these obvious parts have been so generally overlooked; for, except by this naturalist, I find them noticed only, in *Polypodium limbospermum*, by Bellardi. As for the male parts, I know of nobody who has observed them.

† I wish that those botanists, who have opportunities of seeing *Polypodium Phegopteris* and *P. Dryopteris* in different states, would subject them
to

ONOCLEA.—In *O. Struthiopteris* and *O. crispa* the male parts are found upon the sterile leaves, as they are called, and which, therefore, rather deserve the appellation of male leaves.

POLYSTICHUM.—In most species of this genus the sexual parts are easily discovered. The stigmas are particularly large in *Polystichum dissectum* and *P. hirsutulum* (*Polypodia* Forst.); whence they cannot be considered as the characteristic of true *Polypodies*. The male organs of these species are, in general, found very near the female, but more towards the margin.

CYATHEA, DIYALLIA, LINDSÆA.—The female organs mostly very near the margin; the male equally near, occupying the spaces left by the former.

ASPLENIUM.—In *Asplenium* (*Blechnum*) *orientale*, *A. Woodwardioides*, *A. Scolopendrium**, the male parts are very visible on the same leaf with the female; in *Asplenium* (*Blechnum*) *Spicant* they are also distinctly seen, but not on the same leaf with the female: In *Asplenium procerum* male and female parts are on one and the same leaf; but on different leaflets. In these, as in other ferns, the stigmas correspond with the situation and direction of the sporangia.

ADIANTUM.—In this genus the male parts are situate to an accurate examination with regard to the episporangium. Dr. Roth, in the third volume of his *Flora Germanica*, describes this part very circumstantially; but Professor Swartz, in his excellent paper on the ferns, in the botanical journal of Dr. Schrader, does not consider them as furnished with episporangia, and hence refers them to *Polypodium*. In an earlier paper upon this subject, I followed Dr. Roth's authority and description, and did not class them with *Polypodium*; but some time after I found both species in a pretty young state without episporangia. Are they really destitute of them? B.—[All the specimens of the above-mentioned species, which we had an opportunity of examining, were without integuments. TRANSL.]

* I took off the male pellicles at the margin, and no seeds ensued.

closely above the hyposporangia, on the surface of which the stigmas shape their course in short lines. When the time for fecundation approaches, the pollen glides along against these stigmas; and to prevent it from rolling away from them, the hyposporangia are rather bent upwards at the edge.

DENNSTÆDTIA.—In this the male and female parts are likewise sufficiently distinct. The figure I have given of this fern, in the second volume of Schrader's journal; clearly shows the bundles of vessels thickened at their tops.

TRICHOMANES.—Linnæus appears to have been mistaken in terming the sporangiophorum of this genus *style*; for it certainly does not perform the office of this organ. I have not yet had an opportunity to observe any living species of this remarkable genus; and I cannot venture, from the inspection of dried ones, to decide on the mode in which the generative process is conducted in them. They do not, however, appear to possess any thing materially different from other ferns in this respect.

OSMUNDA.—The *O. lunaria* being very scarce in my neighbourhood, I have not, since my discovery, had any opportunity to examine it alive. If I may judge from dried specimens of this plant, the male organs are not situate on the sterile leaf: but in

STRUTHIOPTERIS they are found on the sterile leaflets; and this is perhaps an additional reason why it should be separated from the foregoing genus.

ANGIOPTERIS.—Bundles of vessels, alternately more and less strong, pervade the leaf. The sexual organs are only found on the stronger vessels: the male at the extremities, the female rather lower.

OPHIOGLOSSUM.—What I have said of *Osmunda* will also apply to this.

MARATTIA.—In *M. alata* both organs are almost as
2
distinct

distinct as in *Polypodium vulgare*, but they are rather less conspicuous in *M. fraxinea*.

In most of the species of ferns which I have had an opportunity of examining, the abovementioned organs could not be mistaken ; but in dried specimens seldom any thing more is seen of the male parts than the pellicles. The most convenient time for detecting them is when they have just turned white, and are on the point of falling off ; which, however, is not the case with every species. In some they are difficult to be distinguished even in a fresh state ; for instance, in the common Wall-rue (*Asplenium murale*). Considerable deviations may perhaps also take place in those differently constructed genera, *Lycopodium*, *Tmesipteris*, *Ripidium*, &c. in the dried specimens of which, I confess, my endeavours to discover those organs have been vain. Of the species of *Lycopodium*, none grow with us except *L. clavatum*, which is also very scarce. :

As for the second question, whether such parts are likewise to be found in other plants, I confess that I could never observe any thing similar in any whatever ; nay, in general the reverse is found : the bundles of vessels in their leaves, while they take their course towards the margin, become narrower and narrower, and I could never observe any pellicles connected with them containing similar globules. That the glands which are observed embosomed in the epidermis of some *Crassulæ*, near the margin of the leaves, resemble the male pellicle of many ferns, will hardly be urged by any body as an objection to what I have advanced.

My first discovery relative to the sexual parts of ferns I made some years ago, but did not then venture to publish it : the probability of my conjecture having, however, increased since that time, I do not now hesitate to offer it as such for the decision of the botanical world. I shall pursue my observations on this subject ; and, should those

which I now communicate meet with approbation, fully detail their results at some future period. I shall thankfully acknowledge any assistance which any brother botanist may be inclined to lend me : living specimens of ferns, plants that are very scarce in our botanical garden, are indeed necessary for my purpose ; but I shall feel obliged to them for the communication of any dried specimens of species which are not easily obtained.

I conclude this paper with pointing out a new genus of ferns, which differs from the others in regard to the situation of the sexual parts, and will serve at the same time as an illustration of what I have advanced. *ONOCLEA sensibilis* can no longer be considered as belonging to the genus *Onoclea* : it is indeed furnished, like the true *Onoclea**, with an episporangium commune, as a continuation of the margin of the leaf, and bears like them its episporangia in heaps : but it is sufficiently distinct from them by the episporangia propria, with which these heaps are separately covered. This fern must therefore constitute a genus, which may be placed between *Onoclea* and *Sphæropteris*, and which, on account of the characteristic integument of its capsules, I call

CALYPTERIUM,

Character generis :

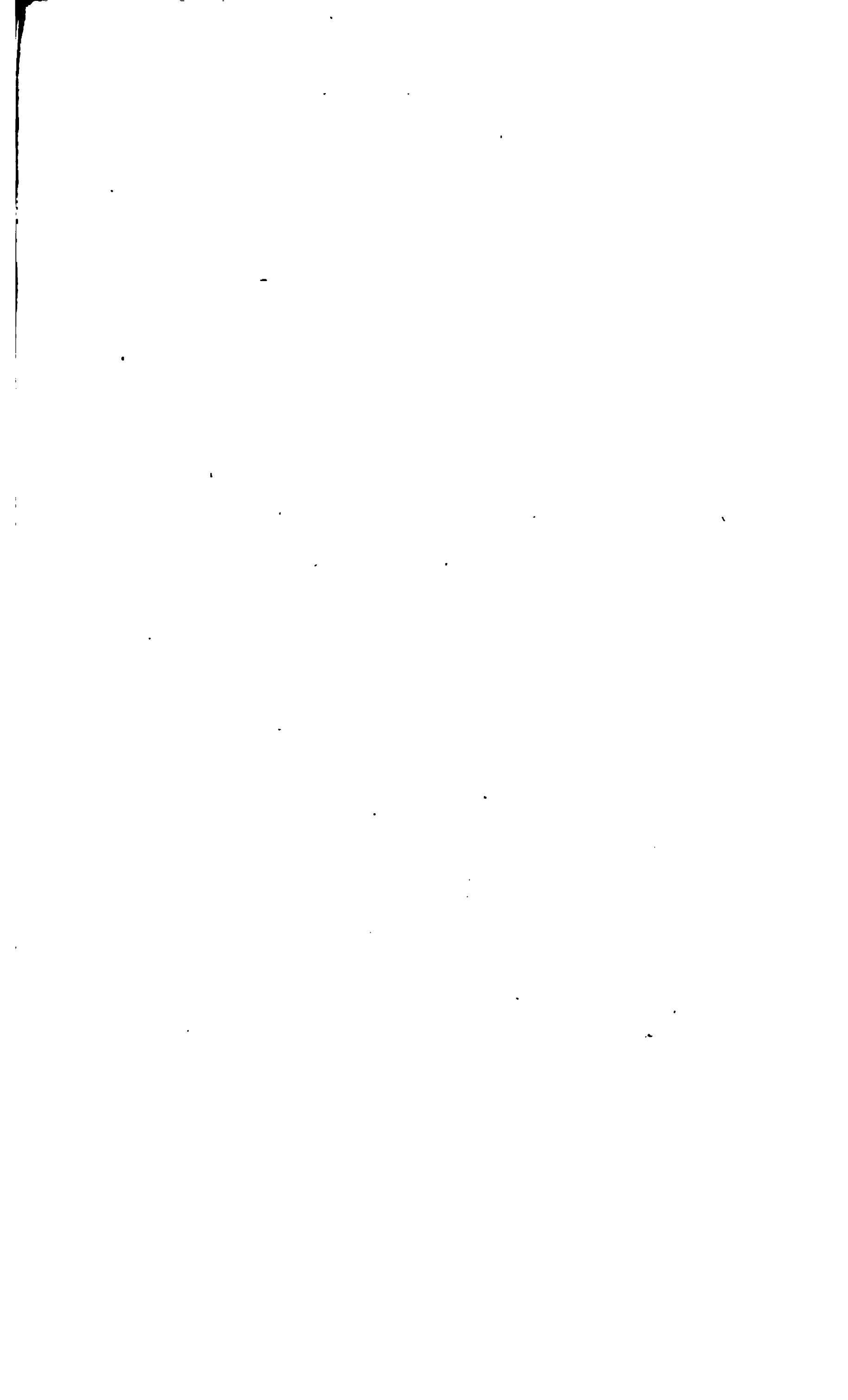
Sporangia pedicellata, punctatim aggregata, pedicellis connatis.

Episporangia propria, lateralia, a communi tecta.

Species : *CALYPTERIUM sensibile*. (*Onoclea sensibilis* L.)

What makes this species still more remarkable is, that

* The true *Onoclea* is *O. sensibilis*. Those species which have been thrown afterwards into this genus might have been made into distinct genera by Dr. Bernhardt, if requisite, as this has been done by Dr. Smith with regard to *O. polypodioides* ; but there is no reason to change the name of the original and only species, though its generic character be given more correctly. TRANSL.





the sterile leaves are separated from the fertile, which bear both the male and female organs; while in *Onoclea* the male leaves are separated from the female ones. The male pellicles are situate on that side of the leaf which is rolled up, advanced before the stigmas; when old they become of a white colour, and are then easily distinguished. In those leaves which bear neither sex, the clusters of vessels which tend towards the margin do not widen, but become gradually narrower.

Explanation of Plate I.

1. A piece of the leaf of *Polypodium aureum*, natural size, viewed from the upper surface. Two stigmas are observable in the middle, and several male pellicles at the margin.
2. A stigma magnified.
3. A lateral view of a section of the stigma magnified. The small canals are seen to pervade the substance of the leaf towards the ovarium.
4. The stigma fallen off, magnified.
5. A male pellicle with two globules of pollen, magnified: it also shows the cavity in which a third has been lodged.
6. A piece of the leaf of *Polypodium pustulatum*, in which, at both sides of the traversing cluster of vessels, two rows of male and one of female organs are observable. Natural size.
7. A piece of the leaf of *Calypterium sensibile*. Natural size.
8. A leaflet of the same, viewed on the side rolled up. It shows six male pellicles that include the common episporangium. Natural size.
9. The same leaflet dissected longitudinally, and displaying the proper episporangia. Magnified.
10. A magnified view of one of its clusters of sporangia.

- It shows the pedicles grown together, and the proper episporangium.
11. A leaflet of the sterile leaf of the same plant. Natural size.
-

V. *Observations on the Inflorescentia of the Genus Crocus,*
by R. A. SALISBURY, Esq. F. R. S., &c.

THE science of Botany is so extensive, and so much time is necessary to a full investigation of any one object in it, that great perfection in all its branches is scarcely to be attained without the cooperation of many labourers. Every unknown matter of fact, especially if it is an exception of those general rules which nature has hitherto been observed to follow in the vegetable kingdom, deserves to be recorded. To suspend our judgment indeed, in forming general conclusions, appears to be one of the most necessary, and perhaps at present the most uncommon examples of botanical wisdom.

The inflorescentia of the genus *Crocus* affords two anomalies of this sort. The great Linné proposed to exclude that part entirely from his generic characters, as belonging rather to the stem and leaves of the plant. He has nevertheless tacitly admitted it, not only in this, but many other genera of the natural order of *Irideæ*, by giving their bractæ the name of calyx: and they are most undoubtedly of primary importance in determining the genera.

The real inflorescentia of *Crocus* is a fasciculus, the whole of which, with part of the tube of the corolla, remains buried under ground during the flowering season, but afterwards the pedunculi are gradually elongated to the surface. There are at present in our gardens twelve distinct

distinct species of this genus, exclusive of varieties : three of these flower in autumn, the rest are vernal plants. The pedunculi in all issue from the axillæ of the inner leaves, either singly or two together : in the latter case they are connected by a very short common scapus, with a bractea near the base of each, the outer of which sheathes both. I know no instance of more than two pedunculi in a fasciculus, having examined many hundreds of roots to ascertain that matter. Though the above characters are very conspicuous in some species, the origin of the pedunculi in others which appear to produce many flowers in one common fasciculus, is more difficult to be accurately understood : careful dissection indeed shows them to be axillary, but when two come out together there is an anomaly ; for that of the first and principal flower has no bractea whatever at its base, being only surrounded by the dilated part of the leaf.

Besides these radical bracteæ in the inflorescentia of *Crocus*, there are others longer, and more spathaceous at the top of the pedunculus, which Linné formerly described very faithfully as being solitary : for though two bracteæ occur in many species, and are without doubt the natural number, I have constantly found them solitary in all the numerous varieties of the plant he had then before him. Nor is this anomaly confined solely to that species, there being two others which have only one bractea under the pericarpium.

That remark, therefore, in one of our best periodical publications, where the author under his *Crocus Susianus*, *Bot. Mag. No. 652.* supposes he “ *corrects an error sanctioned by the names of Linnæus and Jussieu,*” is too hasty : he in fact runs into the opposite extreme, by ascribing two bracteæ to this genus invariably. The true *Crocus Mæsiacus* of the older authors is also a very different species from that figured in the 45th plate of the same work,
and

and will appear in the *Flora Græca*, which is now preparing for the press by the president of the Linnean Society, under the name of *aureus*. Both this and the pale-flowered one from Mæsia, first described by Clusius in his *Hist. Pann. p. 326*, are growing at Mill Hill, and specimens are much at the service of the author alluded to above, if he wishes to publish them in the *Botanical Magazine*: his rapid talents, notwithstanding some mistakes from which nothing human can be totally exempt, have already stamped that work with a high degree of additional value.

VI. *An Account of some scarce Plants that flowered in the Garden and Hothouses of the Museum of Paris in 1802. From the French* of M. DESFONTAINES.*

EUPHORBIA *meloformis*, Melon-Spurge.

(Pl. II.)

EUPHORBIA *inermis*, subrotunda, multangularis; calyce decemfido; laciniis exterioribus scrobiculatis; filamentis villosis.—*E. subglobosa*, *inermis*, multangularis. *Hort. Kew. 2. p. 135. Willd. Sp. Pl. 2. p. 886.*

The Melon Euphorbia is a native of the Cape of Good Hope, and seems to be diœcious; or, at least, that which flowered during the summer in one of the stoves had none but male flowers, the pistils of which were abortive.

Stem without spines, fleshy, pyriformly globular, about three inches in thickness, with a hollow on the top, embossed with from eight to ten keel-shaped ribs, streaked by small traversing fillets of a pale green colour: the remnants of the dried-up peduncles that are often to be seen on the angles look like spines.

* *Annales du Muséum d'Histoire Naturelle*, vol. i. p. 200.



Euphorbia meloformis

The *flowers* are produced on the sides at the top of the plant, supported on short, cylindric, pubescent peduncles with small scattered oval scales; some simple and one-flowered; others terminated by an umbellet of 2, 3, 4, or 5 rays that are frequently bifurcated, with scales at their base. Central flowers commonly sessile.—*Bractes* two, small, applied to the *calyx*, which consists of ten segments; the five inner of which are blunt, pubescent, and placed near the stamens; the others rounded, entire, patent, somewhat fleshy, greenish yellow, very minutely pitted.—*Stamens* 15—18. *Filaments* villous, intermixed with bearded threads, which are nothing more than abortive stamens. Anthers round, bilocular.—*Pistil* abortive.

With the female plant I am unacquainted, nor is any other than the male noticed in the *Hortus Kewensis*. That which we have in the Museum was sent last year from England,

Explanation of the Plate.

1. A flower as it appears when magnified.
2. A part of the flower, showing both the inner and the outer divisions of the calyx.
3. Stamens with the sterile filaments,
4. An abortive pistil.

EUPHORBIA aleppica. Aleppo Spurge.

EUPHORBIA umbella quinquefida, dichotoma; involucellis ovato-lanceolatis, mucronatis; foliis inferioribus setaceis (calyce octofido, laciniis quatuor exterioribus bicornibus). *Linn. Sp. Pl.* 657. *Lamarck Dict.* 2. p. 433.

This fine species of *Euphorbia*, originally from Syria and the Islands of the Archipelago, flowered and bore fruit during this summer for the first time.

From the rootstock spring several straight, simple, herbaceous

baccous stems, of about seven to nine inches in length, tapered downwards, and rendered scarred by the vestiges of fallen leaves.—*Leaves* glaucous, smooth, sparse, very many; lower capillary; upper linear-lanceolate, pointed.

Umbel composed of five or six bifurcated or dichotomous rays, below which are frequently produced peduncles that bear flowers. *General involucre* of 5—6 narrow, lanceolate leaflets; *partial* ones of two leaflets which are oval, pointed, and frequently edged with small teeth.—*Calyx* very small, of 8 divisions; 4 outer yellow, furnished with two small lateral cuspides often reddish.—*Styles* emarginate.—*Capsules* sleek.—*Seed* brown, rounded.

CLITORIA heterophylla. Various-leaved Clitoria.

CLITORIA foliis pinnatis; foliolis quinis; aliis rotundioribus, aliis lanceolatis, aliis linearibus. *Lamarck Dict.* 2. p. 51.

The species of *Clitoria* that I am going to describe, is remarkable for elegance of foliage; for pretty flowers, which are resupinate, and of an azure blue colour. It flowered for the first time about the middle of summer in the hot-house. We are indebted to M. Cossigny for it, who brought the seed from the Isle of France, where it grows spontaneously.

Stem branched, climbing, filiform, above six feet in length, slightly pubescent.—*Leaves* alternate, lower ternate; middle and upper ones pinnate with an odd leaflet: leaflets 7—9, smooth, small, opposite, round, sometimes oval, lanceolate, or even linear, terminated by a bristle-shaped appendage, and not unfrequently emarginate.—*Stipules* on the stem, awl-shaped.

Flowers axillary, solitary, pendent, resupinate. *Pedicles* very slender, a quarter of an inch in length, slightly tumid at the summit, furnished with four small bractes, two of which are inferior; the two upper applied against the calyx.
—*Calyx*

—*Calyx* tubular, somewhat widened upwards, marked with five small prominent lines, terminated by five ovate, acute teeth; the three upper ones the largest.—*Corolla* of a sky-blue colour.—*Standard* elongated, streaked, convex outwards, emarginate on the top, sides raised, longer than the wings, which are brought close to each other, blue, obtuse, ending in a very slender claw.—*Keel* not sharp, formed by two contiguous petals, each borne on a pedicle. Ten diadelphous *stamens*.—*Style* somewhat geniculate.—*Stigma* pubescent, obtuse.—*Pod* smooth, sleek, flattened, pendent, polyspermous, linear, from one and a half to two inches in length, ending in a point; containing 8—10 compressed seeds; the valves twist themselves spirally after they have opened.

STIPA tortilis. Twisted Stipa.

STIPA paniculata spicata, basi involuta, calyce interiore villosa; aristis contortis, inferne villosis. *Desf. Fl. Atl.* 1. p. 99. t. 31. f. 1.—*GRAMEN* avenaceum supinum minus, spica densissima cum longis aristis lanuginosis contortilibus. *Tournef. Inst.* 324.

This Stipa, a native of Egypt and the coasts of Barbary, flowered and seeded in the Museum garden: it is easily known from all other species of its genus, by its yellow spiked panicle, by its villose awns twisted at the lower part, by its interior calyces, which are also villous, detach themselves from the receptacle, and fall with the seed when that is nearly ripe, in the manner of those of the *AVENA fatua* Linn. ☉

SONCHUS resedifolius. Reseda-leaved Sow-thistle.

SONCHUS glaber; foliis inferioribus dentato-pinnatifidis; ramis virgatis, pedunculis unifloris. *Desf. Fl. Atl.* 2. p. 226.—*CHONDRILLA* sicula tragopogonoïdes maritima. *Bocc. Sic.* 13. t. 7. f. A.—*LEONTODON mucronatum.* Forsk.

Forsk. Fl. 144.—*SCORZONERA resedifolia* Linn. *Sp.*

1113.—*SCORZONERA* foliis linearibus, dentato-pinnatifidis, glabris; calycibus apice albido-cartilagineis; caule erecto. *Vahl. Symb.* 2. p. 87.

Linnæus had referred this species to *Scorzonera*; but its sessile pappus, the hairs of which are simple, as well as the other characters of the fructification, show that it really belongs to *Sonchus*: Flowered and seeded this summer for the first time. Introduced by Messrs. Delile and Nectoux. Grows wild in Egypt, Sicily, Malta, and on the coast of Barbary.

The whole plant is smooth and glaucous.—*Root* perpendicular, long, of the size of the little finger. *Stem* polished, straight, from a foot to a foot and a half high, divided into slender branches.—*Leaves* narrow, almost pinnate, dentate; segments unequal, distinct; white and callos at the top; the lower are petioled; the upper sessile.

Peduncles unequal, furnished with a certain number of oval scales, terminated by a single flower.—*Calyx* imbricate, elongated, not unlike that of the common lettuce; *LACTUCA sativa* Linn. *Scales* obtuse, white at the point, membranous at the edges; outer ones oval; inner linear-lanceolate.—*Diameter of the flower* about an inch.—*Semi-florets* yellow upwards, glaucous beneath.—*Seeds* slender, long, striated, brown, crowned by a sessile pappus, of white, simple, very fine hairs. *Receptacle* naked. ☉

This plant delights in sandy uncultivated spots at the sea-side.

BUNIAS spinosa. Thorny Bunias.

BUNIAS ramis spinescentibus. Linn. *Mant.* 90.—*BRASSICA spinosa.* Alpin. *Ægypt.* p. 200. *Ic.*—C. B. *Pin.* 111. *Prodr.* 54. *Ic.*—Matth. edit. C. B. 369. *Ic.*—J. B. *Hist.* 2. p. 835. *Ic.*—*ZILLA myagroides.* Forsk. *Fl.* 121.

n. 74. and 75. t. 13. f. A.—*BUNIAS* siliculis ovatis, acutis; ramis spinosis, floriferis. *Turra. Farset.* 11.

This *Bunias* from Egypt flowered this year for the first time. It is easily distinguished from all the species of the same genus, by thorny branches, as well as by its glaucous hue. It grows in parched sandy situations. Prosper Alpinus says that the leaves, after they have been boiled in water, are eaten by the Arabs.

Root slender, but little branched, from the rootstock of which rise some herbaceous, polished, cylindric *stems*, above a foot in height, parted from the base to the summit into several stiff branches, the last ramifications of which are terminated by unequal divergent spines.—*Leaves* alternate, rather fleshy, flat; the lower elliptic, sometimes lanceolate, or approaching to spatulate, obtuse, unequally toothed and slightly sinuate, decurrent on each side the petiole for some distance, from one to two inches and a half in length. Upper ones lanceolate, narrow, and often quite entire.

Flowers solitary, ranged along the young branches; about the size of those of *BUNIAS Cakile*.—*Pedicles* short.—*Calyx* closed, of the same length as the claw of the petals, the limb of which is violet, obversely oval, entire, and reticulately veined.—The *stamens* have nothing remarkable; two are shorter than the others, as in all cruciferous flowers.—*Style* straight, persistent.—*Stigma* oblong, rather thick.—*Germen* furnished with two small, polished, opposite protuberances, separated by the partition.—*Silicle* sphaeroid, hexagonal, of a bony texture, and wrinkled when ripe, about the size of a pea, divided into two monospermous cells, and terminated by a conic point.—*Seed* rounded.

CORDIA macrophylla. Cordia with large Leaves.

CORDIA foliis ovatis, villosis, sesquipedalibus. *Linn. Sp.*

275. *Redouté. Pict. Mus. Par.*—*PRUNUS* racemosa,
foliis

foliis oblongis, hirsutis, maximis. *Sboane Jam.* 2. p. 130. t. 221. f. 1. *Rai. Dendr.* 43.—*Collococcus platipyllos major*, racemis umbellatis. *Brown Jam.* 168.

This tree came originally from the Antilles, and flowered in the hot-house towards the end of summer. It is very rare in Europe; the two specimens that are in the Museum garden were brought alive from Porto-Rico by M. Riedle, gardener to the expedition that was sent out under Captain Baudin.

CORDIA macrophylla rises to the height of 45 to 60 feet. The *trunk*, which according to Brown is never more than twelve or sixteen inches thick, separates into several cylindrical *branches*, villose while young, several times bifurcate or trifurcate, diverging and declined towards the earth.—*Leaves* alternate deflected, with short rough scattered hairs, from six to thirteen inches long, from three to seven broad, entire or edged with small sharp teeth; nerves obliquely transverse, prominent beneath. *Petiole* short, cylindric, channelled.

Flowers on one side, arranged in small bunches upon a common peduncle, situate in the fork of the branches. On each side of the forks are produced two, sometimes three opposite leaves, one of which, which is also the least, is turned backwards.—*Calyx* oval, villous, persistent, with five upright, straight, obtuse teeth.—*Corolla* white; five segments elliptic, deflected, a little curled, rounded at the top; tube cylindric, entirely villous.—Five *stamens* white, longer than the tube, fixed to its upper part, alternate with the segments of the corolla.—*Anthers* versatile, with two cells separated at the base, attached to the filaments by their backs.—*Germen* superior, oval, sharp.—*Style* filiform.—Four small capillary *stigmas*.—*Drupe* spherical, of the size of a pea, surrounded at its base by the calyx, containing a bony, embossed nut, with two single-seeded cells. ½.

The *CORDIA macrophylla* must be kept in the stove. Brown tells us that its wood is hard, and very proper for use.

VI. On *Ægiceras fragrans* (*Rhizophora corniculata* Linn.)
by CHARLES KONIG.

THIS tree has been first described and figured by H. van Rheede, in the sixth volume of his *Hortus Malabaricus*, p. 65. tab. 36, under the name of *Pou-Kandel*; and afterwards by Rumpf, in the *Herbarium Amboinense* (vol. iii. p. 117. t. 77.), where it is called *de gehoornde Mangiboom*, or *Mangium fruticosum corniculatum*. Why Burmann, the editor of the latter work, has not referred to the *Hortus Malabaricus*, I cannot guess; it is certainly the same plant, and the figure that accompanies it is much superior to that of the *Herbarium Amboinense*.

Linnaeus, with no further knowledge of the plant than that which he acquired from Rumpf, enrolled it with his genus *Rhizophora*, under the name of *Rhiz. corniculata*. The five stamens and petals (as Rumpf calls the laciniae of the corolla) did not obstruct its union with this genus, of which Linnaeus observes, “*Stamina numero differunt uti calyx et corolla* ;” and the place assigned to it in the *Herbarium Amboinense*, among the Mangia, together with the general habit of the fruit as expressed in the figure of this work, convinced him of its being a true species of that genus.

Gærtner, who had an opportunity of examining the fruit, finding it completely different from that of a *Rhizophora*, constituted a new genus of it, under the name of *ÆGICERAS* (from the distant resemblance of the capsule to a ram’s horn); applying to it the specific appellation of *majus*, and adding a description with a figure of the fruit of what he considered a congener, under the name of *minus*.

In consequence of this, and guided by the number of the sexual parts, as pointed out in the *Herb. Amboinense*,

Professor von Schreber, and after him Professor Willdenow, justly placed *Ægiceras* in the first order of the fifth class of the Linnean system. But with the exception of the number of stamens, which is correct, Rumpf's description of the rest of the flower is more or less erroneous; a case but too frequently occurring in his work: and indeed, when we view the state of the science at the period in which he wrote, what would now be deemed a perfect description is not fairly to be looked for. But it is remarkable, that even the accurate Gærtner should have been led into an essential error in regard to the nature of the fruit of his *Ægiceras majus*; for according to his description and delineation (*de fruct. et seminib. plantar. vol. i. p. 216. tab. 46.*) the embryo is inverted, the cotyledons are "longissimæ," three times longer than the radicle; when, on comparing his figure with that annexed to my description, it will at once be seen that the reverse is the case, and that this excellent naturalist (undoubtedly misled by the calyptra-like continuation of the umbilical cord, which covers the small cotyledons, and adheres closely to them when dry) took the lower or radical extremity of the seed for the upper, and hence pronounced the embryo to be inverted. The longitudinal furrow on the concave side of the seed, destined for the reception of the umbilical cord, he considered as the place where his supposed cotyledons divide.

This error has produced another. Gærtner having received, at Leyden, under the name of *Wæl-Kieridi*, some fruits from Ceylon, that bore a distant resemblance to his *Ægiceras majus*, and were really furnished with an inverted embryo, he at once concluded they were those of another species of this genus, and as such described and figured them under the name of *Æ. minus*.

Though, from the respective situation of the embryos in the seeds of *Ægiceras majus* and *Æ. minus*, I was convinced that they could not be congeners, yet Gærtner's giving

giving for a synonym of the latter, the *Umbraculum maris* of Rumpf, which is certainly nothing but a variety of *Ægiceras majus*, or at most a neighbouring species, caused me to hesitate at first; I was, however, soon satisfied that this synonym is entirely wrong, and that his *Æ. minus* is the *SANTALOIDES* of Linnæus (*Fl. Zeylon.* p. 192.), or *CONNARUS Santaloides* of Vahl (*Symbola Botan.* vol. iii. p. 87.). The outward appearance of the fruit, as figured by Gærtner, suggested this idea to me; in which I was afterwards confirmed by a critical examination of the fruit of *Santaloides*, and by the Cingalese name of this plant being the same with that by which Gærtner had received the fruit of his second species.

From all this it follows, that *Ægiceras minus* should be cancelled in Willdenow's "*Species Plantarum*," vol. i. p. 1184. and that Gærtner's description and figure of it should be quoted under *Connarus Santaloides*, vol. iii. p. 693; as also that another specific name should be given to the real *Ægiceras*. I call it *ÆGICERAS fragrans*, as Rumpf states that its flowers, on account of their fragrance, are worn as garlands by the young women of Amboyna.

The amended natural character of *Ægiceras* is as follows:

Calyx persistens, inferus, pentaphyllus: *foliola* coriacea, oblongo-rotundata, bi-trilinearis, concava, basi crassiora, marginibus invicem oblique incumbentibus.

Corolla monopetala, infundibuliformis, quinquepartita, calyce duplo longior, subcoriacea: *tubus* longitudine calycis, conicus, crassiusculus, basi rotundatus; *laciniæ* longitudine tubi, ovato-cordatæ, acuminatæ, reflexæ.

Stamina: *Filamenta* quinque, exserta, subulata, basi connata in annulum imo corollæ tubo insertum. *Antheræ* oblongo-cordatæ, versatiles, bilobæ, biloculares, superne dehiscentes: *pollen* in acervulos concretum ad margines loculamentorum.

Ovarium superum, fundo calycis immersum, oblongo-lineare, compressum, subpellucidum, punctatum; deciduum in stylum attenuatum, suberectum, persistentem, filamentis paulo brevioribus. *Stigma* simplex.

Fructus. Folliculus uncialis, raro sesquiuncialis, coriaceus, glaber, arcuatus, infra cylindricus superne subventricosus, stylo persistente acuminatus.

Funiculus umbilicalis longitudine seminis, tenuis, applanatus, e fundo folliculi oriundus in concava seminis latere ad apicem decurrens, ibique dilatatus in arillum incompletum calypstroideum, acuminatum, membranaceo-fibrosum, cotyledones partemque radiculae arcte obtegentem.

Semen, aut si mavis: *Embryo* erectus, perispermate destitutus, arcuatus, membrana tenui vestitus. *Cotyledones* minimae, vix lineam longitudine superantes, extus convexae intus planae, obtusiusculae, carnosae, cum radícula confluentes. *Radicula* maxima, cotyledonibus duodecies longior, totum fere embryonem constituens, medullosa, cylindrica, basi rotundata, incurva, latere concava, sulco exarata longitudinali pro excipiendo funiculo umbilicali.

The only species of the genus known to me (and of which *Mangium floridum* Rumpf, vol. iii. p. 125. appears to be a variety) is the sweet-scented *Ægiceras*. This shrub is found, in company with different species of Mangrove-trees, and other *plantæ litorales*, on the sea-shores, not only of the Moluccas, Amboyna, and other East India islands, but also at Malabar and the eastern coast of New Holland. Its habit is much that of a *Rhizophora*, at least in regard to the rough bark and the trailing roots: its height is from 10 to 14 feet, and the stems, of which several shoot up from the same root, about 3 to 4 inches in diameter. They send forth thin spreading branches, divided into several branchlets. Leaves mostly alternate, sometimes opposite, from one to four inches long,

I

from



seen by C. Kenta

Naucoraspis traurana

Engraved by F. J.

from eight lines to one inch and a half broad, elliptical or obovate, tapering at the base, mostly notched at the top, ~~thick~~, coriaceous, smooth on both surfaces, entire, with edges rather inflexed; petiole twisted, three to four lines long, running out into a strong longitudinal rib, that emits ~~rib~~ variously divided. We learn from Rumpf that the ~~leaves~~ have a briny taste, when fresh. The white, sweet-scented flowers, when expanded, and before their segments become reflected, are nearly half an inch in diameter; they are disposed, on slender stalks from one inch to an inch and a half long, in close straight umbels, situate on small cylindrical knobs in or near the axils of the leaves.

Explanation of Plate III.

A small flowering branch of *Ægiceras fragrans*.

- a. the calyx.
- b. a leaflet of the same separated.
- c. a complete flower.
- d. back view of the corolla.
- e. the same laid open longitudinally, with the connate stamens bent downward.
- f. front and back view of the anthers; magnified.
- g. pistil, natural size.
- h. magnified.
- i. a single capsule.
- k. the same laid open longitudinally, to show the manner in which the seed is fixed by means of the umbilical cord.
- l. the naked seed with the divided cotyledons; natural size.

VII. *Supplementary Remarks on Professor WILLDENOW's new Edition of LINNÆUS's Species Plantarum. Berlin, 1797—1800. 8vo. from the German* of Dr. ROTH.*

CONSIDERING the shortness of the intervals that have intervened between the publication of the volumes of this edition of the “Species Plantarum,” it must be allowed that Professor Willdenow has performed all that could be expected from individual exertion. The discoveries made in the vegetable kingdom, since Reichard's edition of the same work, are so numerous, that to peruse all the authors in which they are contained, and to make a judicious selection of materials, is a task of no easy performance; and after all it is impossible that such an undertaking, with how great care soever it may have been carried on, should be free from defects: hence every assistance afforded to the pointing out of errors in such a work, and consequently to bring it nearer to perfection, cannot but be highly welcome to the editor as well as to the purchasers.

1.

The character of the genus *MNIARUM* *Spec. Plant. tom. 1. p. 30.* *DITOCA* of Gärtner (de fruct. et seminib. plant. tom. 2. p. 196. t. 126.) ought to be changed as follows: Involucrum tetraphyllum, biflorum. Calyx quadrifidus, superus†. Corolla nulla. Semen 1.—Vid. Linn. Gen. Plant. ed. Schreber. tom. 2. p. 816. n. 19.

2.

The genus *CINNA* *Spec. Pl. tom. 1. p. 31.* is to be cancelled. The grass, so well described by Linnæus as *Cinna arundinacea*, may justly be considered a species of *Agrostis*.

* Roth's neue Beiträge zur Botanik, vol. i. p. 63.

† *Mniarum* has certainly *calyx inferus*, which may be even seen in the fruit, which it envelopes; and more distinctly in the flower. TRANSL.

According

According to the American specimen (for which I am obliged to the president of the Imperial academy Nat. Curiosorum) which answers completely the Linnean description, this species should be placed in the first division, between *A. stricta* and *ovata* (Sp. Plant. tom. 1: p. 366.) and characterized as follows :

AGROSTIS *Cinna*.—*A. panicula oblonga secunda, floribus monandris, petalo exteriori sub apice aristato.*

Cinna arundinacea Linn. Syst. Pl. ed. Reich. tom. 1. p. 12.

Ligula oblonga, laciniata. Flosculi constanter monandri.

Petalum exterius intra minorem calycis valvulam dorso sub apice arista recta, brevi, valida, scabra auctum.

Obs. This grass ought not to be confounded with *Agrostis Cinna* Retz. Obs. bot. fasc. 5. p. 18. et fasc. 6. p. 22., to which it bears some resemblance, but which is *Agrostis mexicana* of Linnæus.

3.

JASMINUM *simplicifolium* Spec. Plant. tom. 1. p. 38.

According to the observation of my friend Professor Mertens, the JASMINUM *oblongum* Burm. Ind. p. 6. tab. 3. fig. 2., given as synonym to the above species, cannot by any means belong to it. In Burmann's plant the peduncles are described as "axillares alterni uniflori," while those of *Jasminum simplicifolium* are terminales brachiati, and not one of them is found axillary. The specific difference of that plant may, therefore, be expressed as follows: *J. foliis oppositis ovato-lanceolatis simplicibus, pedunculis terminalibus trichotomis**.

4.

VERONICA *Teucrium* Linn. Spec. Plant. tom. 1. p. 66.

* There is, indeed, a variety of *Jasminum simplicifolium*, in the Bankian herbarium, with axillary cymes; but still the synonym of Burmann is inapplicable to that plant; for the figure in the Flora Indica, in our opinion, rather expresses the habit of an *Apocinea*. TRANSL.

This plant, we learn from Dr. Smith (Linn. Transact. vol. 1. p. 191.), is not preserved in the Linnean herbarium, and Professor Willdenow considers it as a dubious species, since it has been confounded by botanists both with *Veronica latifolia* L. and with the larger variety of *Veronica prostrata*. The mistakes concerning this species are probably owing to this circumstance, that in Linnæus's "Systema Vegetabilium," procumbent stalks (*caules procumbentes*) are ascribed to it, though its stalk is certainly erect; a habit justly pointed out as characteristic in the first editions of "Species Plantarum." All those plants which I have hitherto received under the names of *Veronica latifolia* and *Pseudo-Chamædrys* Jacq., were *V. Teucrium*. I was not able to account for this until I was freed from my dilemma by Baron Wulfen, undoubtedly the best authority in this case, who sent me dried specimens of Jacquin's *Veronica latifolia*, *Pseudochamædris*, and *urticifolia*, and thus enabled me to throw some light upon the subject:

Prof. von Jacquin, who did not know the true *Veronica Teucrium* of Linnæus, mistook it at first for *V. latifolia* L. (Dr. Host, in his *Synopsis Plantar. Austriac.* p. 10. is still labouring under the same error); the true *Veronica latifolia* L. he considered as a new species, which he called *Veron. urticifolia*. (Vid. Jacquin's *Flora Austr.* vol. 1. p. 37. tab. 59.) Afterwards Prof. Jacquin changed his opinion, and called the *Veronica Teucrium* of Linnæus *V. Pseudo-Chamædrys* (Jacq. l. c. p. 37. tab. 60.); while the larger variety of *Veronica Teucrium*, described in my "Flora Germanica," vol. 2. part 1. p. 13, under the name of *β. major*, was considered by him as *V. latifolia* L. From this it appears, that *Veronica urticifolia* Jacq., as being the true Linnean *V. latifolia* (Spec. Plant. tom. 1. p. 70. n. 43.), ought to be omitted, and the synonymy of *Veron. Teucrium* and *latifolia* altered.

Though *Veronica Teucrium* appears nearly related to
Veron.

Veron. prostrata, yet it is no matter of difficulty to distinguish the one from the other, if due attention be paid to the nature of the calyx. I hope to remove all doubts and errors that have hitherto prevailed in regard to the synonyms, by the following characteristics :

1. *VERONICA prostrata*.—*V. racemis lateralibus, calycis quinquepartiti laciniis tribus brevissimis, foliis oblongo-ovatis serratis, caule prostrato.*

V. racemis lateralibus, foliis oblongo-ovatis serratis, caulibus prostratis. Linn. Spec. Plant. tom. 1. p. 67. Roth Flora German. tom. 1. p. 7. tom. 2. pars 1. p. 14. Moench Flora Hass. n. 11. tab. 1. (figura bona, excepto calyce seorsim delineato.)

Calyx quinquepartitus : laciniis duabus reliquis tribus duplo longioribus, æqualibus, lineari-lanceolatis ; tribus brevissimis, linearibus, obtusiusculis.

2. *VERONICA Teucrium*.—*V. racemis lateralibus longissimis, calycis quinquepartiti lacinia quinta minima, foliis ovatis rugosis dentatis obtusiusculis, caule erecto.*

V. racemis lateralibus longissimis, foliis ovatis rugosis dentatis obtusiusculis, caulibus procumbentibus. Linn. Spec. Plant. tom. 1. p. 66. Roth Flora Germ. tom. 1. p. 1. tom. 2. pars 1. p. 13. cum synonymis.

V. Pseudo-Chamædrys Jacq. Flora Austr. tom. 1. p. 37. tab. 60.

β. major Roth Fl. Germ. 2. pars 1. p. 13. cum synonymis.

V. latifolia racemis lateralibus, foliis cordatis sessilibus rugosis obtuse serratis, caule stricto, foliolis calycinis quinis. Hort. Kew. 1. p. 24. Linn. Spec. Pl. tom. 1. p. 71. exclusis synonymis. Host Synops. Plant. Austr. p. 10.

Caulis basi tantum procumbens, cæterum erectus. Calyx quinquepartitus : laciniis lineari-subulatis ; quatuor sub-æqualibus ; quinta minima.

3. *VERONICA latifolia*.—*V. racemis lateralibus, calycis quadripartiti*

quadripartiti laciniis æqualibus, foliis cordatis rugosis serratis, caule stricto.

V. racemis lateralibus, foliis cordatis rugosis dentatis, caule stricto. *Linn. Syst. Plant. ed. Reich. tom. 1. p. 34. cum synonymis.*

V. *urticifolia* racemis lateralibus, foliis cordatis sessilibus argute serratis acuminatis, caule stricto, foliolis calycinis quaternis. *Hort. Kew. 1. p. 24. Linn. Spec. Plant. tom. 1. p. 71. (cum synonymis.)*

V. *urticifolia* racemis lateralibus, foliis ovato-lanceolatis argute serratis hirtis, caule erecto. *Jacquin Flora Austr. tom. 1. p. 37. tab. 59. Linn. Suppl. p. 83. Host Synops. Plant. Austr. p. 10.*

Calyx multo minor quam in duabus antecedentibus, quadripartitus: laciniis æqualibus, ovalibus, obtusis. Folia cordata, argute serrata.

5.

With *UTRICULARIA minor* (Spec. Plant. tom. 1. p. 112.) a plant has hitherto been confounded, which is now better determined by Mr. Hayne. In order to distinguish this species from the two others, to which it is nearly related, the specific characters of *Utricularia vulgaris* and *minor* require alteration:

1. *UTRICULARIA vulgaris*.—U. nectario conico, labio superiore integro palato subæquali, foliis pinnato-multipartitis: laciniis capillaribus. *Roth Catalecta bot. fasc. 2. p. 1. Hayne in Schrader's Journ. für die Bot. vol. 2. p. 17. n. 1. pl. 6. A.—U. vulgaris. Spec. Plant. tom. 1. p. 112. (cum synonymis.)*

2. *UTRICULARIA intermedia*.—U. nectario conico labio inferiori adpresso, labio superiore integro palato duplo longiore, foliis palmato-multipartitis: laciniis capillaribus. *Roth Catalecta bot. fasc. 2. p. 1. Hayne in Schrad. Journ. f. d. Bot. vol. 2. p. 18. n. 2. pl. 5. Termini*

mini bot. n. 6. pl. 26. fig. 6.—*U. minor. Oeder Flora Dan. tab. 128.*—*U. vulgaris minor. Ehrhart Herbar. n. 91.*

Habitat in Dania, prope Berolinum et Upsaliam. *U.*

3. *UTRICULARIA minor.*—*U. nectario carinato; labio superiore emarginato petalo æquali, foliis tripartitis: laciniis capillaribus dichotomis. Roth Catal. bot. fasc. 2. p. 1. Hayne in Schrad. Journ. vol. 2. p. 22. n. 3. pl. 6. B.*—*U. minor. Linn. Spec. Plant. tom. 1. p. 112. (excluso synonymo Oederi.)*

6.

JUSTICIA hyssopifolia pedunculis axillaribus, foliis lanceolatis obtusis. *Spec. Plant. tom. 1. p. 97.*

Linnæus, in his *Hortus Cliffortianus* 10., says of this species: *folia lineari-lanceolata*; and the specimen in the herbarium of Prof. Mertens has also *folia lineari-lanceolata, brevi mucrone terminata**.

7.

VERBENA nodiflora. *Spec. Pl. tom. 1. p. 117.* To this belongs:

Verbena nodiflora incana curassavica latifolia. Plukenet Alm. tab. 232. fig. 4.†

8.

LYCOPUS europæus, foliis sinuato-serratis. *Spec. Pl. tom. 1. p. 120.*—Here is to be added

β. Foliis tenuius laciniatis. Plukenet Alm. tab. 45. fig. 1.

9.

SALVIA triloba tomentosa, foliis petiolatis rugosissimis tri-

* The form of the leaves of this plant is subject to variation: some of them are nearly oval; and the more they approach to this form, the less the abovementioned mucro is observable. The narrow leaves seem to be more peculiar to the cultivated plant. *TRANSL.*

† Another synonym is: *Blæria nodiflora Gärtn. de fr. et semin. pl. tom. 1. p. 266. tab. 56. TRANSL.*

lobis lobo intermedio producto oblongo, lateralibus ovatis obtusis. *Spec. Pl. tom. 1. p. 130. Linn. Suppl. Plant. p. 88.*

Salvia cretica pomifera Plukenet Alm. 329. tab. 57. f. 2., given as a synonym of that species, does not appear to belong to it; for this figure does not express a single *folium trilobum*, but the stem-leaves are all ovate, and those of the spike *ovato-lanceolata*.

10.

SALVIA bicolor foliis ovatis eroso-dentatis, floribus nutantibus, lacinia media labii inferioris corollæ concava. *Sp. Plant. tom. 1. p. 136.*

Confer Schousboe's *Marocco, pars 1. p. 17.*

11.

Between *Salvia vulnerariæfolia* and *S. pinnata* (*Spec. Plant. tom. 1. p. 149. n. 67-68*) is to be placed

SALVIA interrupta.—*S. foliis interrupte pinnatis, caule frutescente erecto. Schousboe Marocco, pars 1. p. 18. tab. 1.*—Habitat in Provinciis australioribus Imperii Marocani.

12.

Gramen geniculatum brevifolium crispum, spica purpureo-sericea maderaspatanum, Pluk. Alm. 177. tab. 119. fig. 1. is given as a synonym both to *Anthoxanthum indicum* (*Spec. Pl. tom. 1. p. 157.*) and to *Perotis latifolia* (*Sp. Pl. tom. 1. p. 324.*). To which of the two does it belong*?

13.

CRYPsis aculeata. Spec. Plant. tom. 1. p. 158; to be added:

Crypsis aculeata spicis capitato-hemisphæricis, glabris, vaginis mucronatis subpungentibus cinctis; caulibus ra-

* *Anthox. indicum* and *Perotis latifolia* appear to be one and the same plant. TRANSI.

monis. *Lamarck Illustr. n. 856. tab. 42. fig. 2.*
Schousboe Marocco, pars 1. p. 92.—*Antitragus aculeatus*
Gærtn. de fruct. et sem. pl. tom. 2. p. 7. tab. 30.

Phleum schœnoides L., given as variety β to this plant, with Scheuchzer's synonym, does not belong to it; it is a species of *Spartina*, as I shall show hereafter.

14.

PIPER hispidum foliis ovatis acuminatis obliquis hirsutis rugosis, nervis alternis (venosis W.), spicis erectis, *Spec. Pl. tom. 1. p. 163.* is to be changed for

PIPER hirsutum.—P. foliis ovatis acuminatis obliquis rugosis geniculisque hirsutis; spicis erectis. *Swartz Flor. Ind. occ. tom. 1. p. 60.*—P. *hispidum*. *Swartz Prodr. p. 15.*

15.

PIPER scandens:—P. herbaceum foliis ovatis, acutis; caule radicante simplici adscendente, *Spec. Pl. tom. 1. p. 165. Swartz Prodr. p. 16.*, is to be cancelled. According to Professor Swartz's later observations (*Fl. Ind. occ. tom. 1. p. 68. Obs.*) it is nothing but a variety of *Piper glabellum* *Spec. Pl. l. c. n. 33.*

16.

MORÆA. *Spec. Pl. tom. 1. p. 170. n. 98.* Its generic character should be as follows:—Corolla sexpartita: laciniis alternis inæqualibus patentibus. Stigmata tria, bifida*.

17.

To *VALERIANA pyrenaica* *Spec. Pl. tom. 1. p. 179.* is to be added: *Valeriana maxima* *Cacaliæ folio. Pluk. Alm. tab. 232. fig. 1. bona!*

18.

MELOTHRIA. *Spec. Pl. tom. 1. p. 189.*—Unless the

* This character *Morœa* has in common with many genera of the natural order to which it belongs. TRANSL.

twenty-third class (Polygamia) of the Linnean system be given up, and its plants arranged in the other classes according to the number and nature of the stamina, the genus *Melothria* cannot on any account keep its place in the third class, which Linnæus chose to assign to it; as I have shown in my *Catalecta botanica*, fasc. 2. p. 124.

19.

IXIA bulbocodium.—I. scapo unifloro, foliis linearibus, canaliculatis, angulatis. *Spec. Pl. tom. 1. p. 196. Poiret Iter. 2. p. 84. Schousboe Marocco, pars 1. p. 25.*

I. scapo ramoso, ramis unifloris, foliis sulcatis, filiformibus. *Lamarck Encycl. 3. p. 335.*

My much esteemed friend, Mr. Schousboe, when consul at Morocco, observed there three varieties of this species, of which he has communicated specimens to me. According to his just observation the synonymy of this species ought to be as follows:

α. major.

IXIA Bulbocodium caule unifloro, foliis linearibus canaliculatis conniventibus, floribus sulcatis patentissimis. *Jacq. Icon. rar. 2. t. 271. Desfont. Fl. Atlant. 1. p. 34.*

Bulbocodium. Miller Icon. tab. 240.

Crocus vernus angustifolius III. Clus. hist. 1. p. 208.
(quoad iconem, nec quoad descriptionem.)

Corolla cœrulea: fundo ad medium usque croceo.

β. media.

Ixia Bulbocodium var. *β Lamarck l. c. p. 335. Illustr. tab. 31, fig. 1.*

Crocus vernus angustifolius I. Clus. hist. 1. p. 207. (quoad figuram.)

Corolla omnino cœrulea.

γ. minor.

Ixia Bulbocodium var. *α Lamarck l. c. p. 335.*

Crocus vernus angustifolius II. Clus. hist. 1. p. 207.

Corolla dilute purpurea; fundo croceo.

20.

SISYRINCHIUM viviparum Pluk. Alm. tab. 224. fig. 8. is given as synonym both to *Gladiolus montanus* (Spec. Pl. tom. 1. p. 208.) and *Gladiolus galeatus* (ib. p. 212.). Which of the two plants has a claim to it *?

21.

COMMELINA benghalensis Spec. Pl. tom. 1. p. 250.—*Ephemerum benghalense* serpens, folio subrotundo brevi phalangoides. *Plukenet Alm. tab. 27. fig. 3. (nec fig. 5.)* †

22.

To *COMMELINA vaginata* Spec. Pl. tom. 1. p. 252. belongs:—*Ephemerum phalangoides maderaspatanum* minimum, secundum caulem quasi ex utriculis floridum. *Pluk. Alm. tab. 174. fig. 3.* ‡

23.

SCHÆNUS effusus (Spec. Pl. tom. 1. p. 266. Swartz Prodr. p. 19.), according to subsequent observations in Swartz's Fl. Ind. occ. tom. 1. p. 98., is a mere variety of *SCHÆNUS Mariscus* L. (Sp. Pl. 1. c. p. 259.)

24.

SCIRPUS articulatus.—*S. culmo tereti nudiusculo semigeniculato, capitulo glomerato laterali* Spec. Pl. tom. 1. p. 290.

In the later works of Linnæus we find the expression “culmus semigeniculatus,” which is not to be met with in the earlier editions, and may lead into error. By *culmus geniculatus* we understand a culm bent at the joint in the

* The name in Plukenet's work is *Sisynrichium viperatum*: according to Mr. Gawler it belongs to neither of the above plants, but to his *GLADIOLUS viperatus* Bot. Magaz. 688. where the point of interrogation added to that synonym is to be erased. TRANSL.

† And page 135 instead of p. 103. TRANSL.

‡ Plukenet's figure agrees much better with *Tradescantia axillaris* TRANSL.

manner of the knee; while in this plant the stalk is erect, completely straight, without any such kind of bendings, but divided, by elevated annulate circles, into joints of different lengths: hence "*culmus semigeniculatus*" of the specific difference should be altered into *culmus articulatus* or *inæqualiter articulatus*.—As this species has a lateral head, composed of several spikelets, nobody would expect to find it in the first division of this genus * *Spica unica*: it evidently belongs to the second division ** *Culmo tereti polystachyo*.

23.

Between *Scirpus polytrichoides* Spec. Pl. tom. 1. p. 295. n. 15. and *S. acicularis* n. 16. should be inserted:

SCIRPUS schœnoides:—*S. culmo setaceo compresso striato, spica ovata, involucro monophyllo brevi membranaceo, seminibus turbinato-compressis. Retz. Obs. fasc. 5. p. 14. n. 20.*

Variat spicis duabus.—Habitat in India. Gerard Kœnig.

Among the specimens which Dr. G. Kœnig has sent to Dr. von Schreber under the name of *Schœnus bulbosus* L., and for some of which I am obliged to the last-mentioned gentleman, one is found with a double spike; the upper pedunculated and prominent beyond the lower for nearly an inch. Though this may not frequently be the case, it still deserves not to be passed unnoticed.

26.

SCIRPUS Holoschœnus.—*S. culmo tereti nudo, spicis subglobosis glomeratis pedunculatis, pedunculo diphylla inæquali mucronato. Spec. Pl. tom. 1. p. 297.*

In this species we never met with a "*pedunculus diphyllus inæqualis mucronatus*," but the diphyllous involucre is of unequal length and acuminate: this ought therefore to be altered in the specific difference. As for the two quotations: *Oeder Flora Dan. tab. 464.* and *Roth Flora Germ. tom. 1. p. 22. tom. 2. pars 1. p. 58.* they must be omitted;

omitted; for the plant figured in the former work as *Scirpus Holoschoenus*, and from which I adopted it in my Flora, is the smaller variety of *SCIRPUS lacustris* Flor. Germ. tom. 2. pars 1. p. 57. β . *minor*. I was fully persuaded of this when I afterwards had an opportunity of seeing the Flora Danica, and the live plant on the spot pointed out by Oeder.

SCIRPUS romanus is distinguishable from *SCIRPUS Holoschoenus* L. (but scarcely more than as a variety) by its single sessile heads, and the involucre's being sometimes rather more elongated. Except as to these parts, there is no difference between them. It is now several years that I have cultivated *Scirpus Holoschoenus* in my garden, and have observed that every year, from the same root, among the culms with several pedunculated globular heads, there also appear others somewhat thinner, with a single sessile head (which therefore are the *Scirpus romanus* of Linnæus), and others again which, together with the sessile one, bear a single peduncled head. *Scirpus australis* L., to judge from outward appearance, seems to be distinguishable from *Scirpus Holoschoenus* by more tender culms, and particularly by the involucre being lengthened far beyond the head. The specimens gathered in the neighbourhood of Baaden, and communicated to me by Dr. Frölich, are furnished with heads not larger than a small pea; but in the construction of the parts of the flower I find no difference between this species and *S. Holoschoenus*. In *Scirpus romanus* and *australis*, the lower involucre is pressed backwards by the expansion of the sessile head of flowers, so as almost to be reflexed closely to the culm: in *Scirpus Holoschoenus*, on the contrary, this does not take place, on account of the slender stalks of the heads; the lower involucre is left to itself, and assumes a more erect position. But this circumstance is not sufficient to separate these plants specifically: besides, *Scirpus Holoschoenus, romanus*

and australis agree in having leaves and involucre channelled.—These three Linnean species, approaching each other so closely as to afford no limits of distinction, ought therefore to be reduced to one, as has been done by Dr. Smith in his *Flora Britan.* vol. 1. p. 53.

27.

The distinctive characters of *Scirpus triqueter* and *S. mucronatus* L. (*Sp. Plant.* tom. 1. p. 302. 303.) not being given with sufficient precision, and the synonyms wanting correctness, the German botanists have been led into error with regard to the determination of these species. Linnæus gives the specific characters of *Scirpus triqueter* thus: “*S. culmo triquetro nudo, spicis subsessilibus pedunculatisque mucronem æquantibus.*” But this species has not a triangular culm with sharp edges, but one of three sides with blunt edges (*trigonus*). The ovate obtuse spicules are, moreover, in fascicles, and of these some are sessile, others with stalks; but the flower-stalks (at least in our neighbourhood) very seldom reach the length of the point of the culm projecting over the panicle. *Scirpus mucronatus* is known partly by the sharp triangular culm with hollowed sides, partly by the long and recurved point of the culm, projecting beyond the sessile fascicle of flowers. The last circumstance has been entirely overlooked as a distinctive mark. Among the references of this species we find one to Scheuchzer's *Agrostographia* tab. 9. f. 14.; but on comparing this figure with the plant itself, it strikes us that Scheuchzer could not have intended it for this species, as the point projecting over the fascicle is completely upright; and it would for ever remain an object of doubt, unless we learned from Dr. Smith, (in an observation on *Scirpus triqueter* *Fl. Brit.* vol. 1. p. 56.) that according to Sherard's herbarium, Scheuchzer's plant is still to be referred to *Scirpus mucronatus*. As synonyms of this species we find, moreover, Haller's *Scirpus caule triquetro, panicula*

panicula laterali ramosa, locustis ovatis (Hist. Stirp. Helv. no. 1338.), and Scirpo-Cyperus maritimus humilis, &c. (Michel. Nov. Gen. p. 47. Ord. II.), which obviously do not belong to it: the former of them is to be referred to *Scirpus triqueter* L., the latter to my *Scirpus mucronatus* in Flora Germanica. I should scarcely have ever extricated myself from this maze of errors, had it not been for the instructive specimens that I received from Messrs. Wulfen and Willdenow, which have made me better acquainted with the Linnæan *Scirpus mucronatus*, and have enabled me to compare and determine more accurately these three species so nearly related.

In the neighbourhood of Vegesack, on the banks of the *Wezer*, the *Scirpus triqueter* of Linnæus is found in abundance, and, mixed with it, another nearly allied species, which is however sufficiently distinguishable by the different structure of its culm, and particularly by its spikelets. These variations of the two species can, therefore, not be ascribed to a difference in the nature of the soil. The species to which I allude has been separated already by Ray and Plukenet from *S. triqueter*; and, indeed, its three-sided culm with sharp edges, its fascicles of flowers, which are constantly sessile, its oblong spikelets, and the external calycine glume, which is double the size of the inner glumes, are differences of considerable importance. I had still now mistaken this species for *Scirpus mucronatus* L., under which name I have also inserted it in my Flora Germanica. Drs. Willdenow and Smith consider it as a mere variety of *Scirpus triqueter*; but after repeated examination and careful comparison of both the plants in their wild state, I am prompted to retain them as distinct species. I shall here attempt to give descriptions of these three species with their respective synonyms:

1. *SCIRPUS trigonus*. *S. culmo trigono nudo, spicis ovatis*

L 2
obtusis

obtusis lateralibus fasciculatis sessilibus pedunculatisque, mucrone erecto.

S. triqueter culmo triquetro nudo, spicis subsessilibus pedunculatisque, mucronem æquantibus. *Linn. Sp. Pl. tom. 1. p. 302.* (exclusa varietate β .) *Flora Germ. tom. 1. p. 23. tom. 2. pars 1. p. 59.*

S. caule triquetro, panicula laterali ramosa, locustis ovatis. Hall. Helv. n. 1338.

Culmus trigonus : latere paniculam emittente læviter canaliculato ; reliquis duobus planis, vix parum elevatis, hinc anguli obtusi. Spicæ ovatæ, obtusæ, fasciculatæ, sessiles et pedunculatæ. Gluma calycina corollis magnitudine æqualis.

2. *SCIRPUS triqueter*. *S. culmo triquetro nudo, spicis ovali-oblongis subacuminatis, sessilibus conglomeratis lateralibus, mucrone erecto.*

S. triqueter β . *Spec. Pl. l. c. p. 303. cum synonymis.*

S. mucronatus culmo triangulo nudo, spiculis lateralibus oblongis conglomeratis sessilibus, mucrone erecto. *Roth Germ. tom. 1. p. 23. tom. 2. pars 1. p. 60.*

Scirpo-Cyperus maritimus humilis, &c. Michel. Nov. Gen. p. 47. Ord. II.

Culmus triqueter, nec trigonus, humilior plerumque quam in antecedente, mucrone supra paniculam longiore et acutiore. Spicæ ovali-oblongæ, subacuminatæ, duplo saltem acutiores quam in antecedente, constanter sessiles et conglomeratæ. Gluma calycina corollis duplo fere major longiusque mucronata.

3. *SCIRPUS mucronatus*. *S. culmo triangulo acuminato, spicis ovatis conglomeratis sessilibus lateralibus, mucrone horizontali.*

S. mucronatus caule triangulo nudo acuminato, spicis conglomeratis sessilibus lateralibus. *Linn. Sp. Pl. tom. 1. p. 303.* (exclusis synonymis Halleri et Michellii.)

S. glomeratus.

S. glomeratus. *Scopoli Carn. ed. 2. n. 63.* (optime convenit, exceptis synonymis.)

Scirpo-Cyperus palustris, caule molli, panicula nitida glomerata, semine nigro. *Michel. Nov. Gen. p. 47.*
Ord. III.

Habitat in Carinthiæ et Carniolæ paludibus. WULFEN.

Culmus duplo crassior quam in duobus antecedentibus, triqueter, triangulus, tricarinatus. Mucro supra glomerulum, præsertim in fructifera planta, ad latus horizontaliter reflexus, duplo vel triplo longior et crassior quam in *Scirpo trigono* et triquetro, apice obtuse mucronatus. Spicæ ovatæ, crassiores et longe plures in glomerulo deussissimo.

28.

ERIOPHORUM.—Linnaeus ascribes a simple spike to *ERIOPHORUM virginicum*, and says it hence resembles *Eriophor. vaginatum*; but upon nearer examination we find that it is furnished with a close panicle composed of many spikelets, and that it is, besides, distinguishable at first sight from all other species by its very long and leaf-like involucre at the base of the panicle. In order to facilitate the determination of the species, a certain order ought to be observed, both with regard to their divisions and individual characters.

* *Monostachya*:

1. *ERIOPHORUM vaginatum*.—*E. culmis vaginatis teretibus, foliis triquetro-canaliculatis, spica florifera ovata.*

E. culmis vaginatis teretibus, spica scariosa. Spec. Pl. tom. 1. p. 312.—Glumæ acuminatæ patentēs.

2. *ERIOPHORUM Scheuchzeri*.—*E. culmis basi vaginatis teretibus, foliis tereti-canaliculatis, spica florifera subrotunda.*

E. Scheuchzeri Hoppe bot. Taschenb.

Juncus alpinus capitulo tomentoso majori. Scheuchzer Agrost. p. 304. Append. tab. 7. bona figura!

Hab. in alpibus Salisburgensibus et Rhæticiis. 4.

3. *ERIOPHORUM alpinum*.—E. culmis nudis triquetris, spica pappo brevior. *Linn. Sp. Pl. tom. 1. p. 314.*

** *Polystachya* :

4. *ERIOPHORUM polystachyum*.—E. culmis foliosis teretibus, foliis planis, spicis pedunculatis, seminibus ovatis, E. culmis teretibus, foliis planis, spicis pedunculatis. *Linn. Sp. Pl. tom. 1. p. 312.* (excluso synonymo Pollichii) *Trans, Linn. Soc. vol. 2. p. 289.*

5. *ERIOPHORUM angustifolium*.—E. culmis foliosis teretibus, foliis canaliculato-triquetris, spicis pedunculatis, seminibus ovatis.

E. culmis foliosis teretibus, foliis canaliculato-triquetris, spicis pedunculato-erectis. *Linn. Sp. Pl. tom. 1. p. 313.*

E. polystachyum, *Pollich Palat. n. 52.* (secundum specimina in loco a Pollichio indicato a Viro veneratiss. Doctore Koch collecta.)

Differt ab antecedente : statura majore ; foliis multo longioribus et angustioribus, canaliculato-triquetris ; involucri communi paniculâ longiore.

6. *ERIOPHORUM gracile*.—E. culmis teretibus foliosis, foliis triquetris sursum canaliculatis, spicis pedunculatis, seminibus linearibus. *Roth Catal. bot. fasc. 2. Append. cum synonymis indicatis.*

Habitat in Palatinatu et in alpibus Salisburgensibus. 4.

Differt ab E. angustifolio, cui proximum : statura tenuiore, graciliore ; foliis superne tantum canaliculatis : culmis ultra medium ancipitibus ; involucri communi panicula duplo brevior ; seminibus linearibus.

7. *ERIOPHORUM virginicum*.—E. culmis foliosis teretibus, foliis planis, panicula capitata pappo brevior : spicis sessilibus.

E. culmis foliosis teretibus, foliis planis. *Linn. Sp. Pl. tom. 1. p. 313.*

Panicula compacta, capitata, involucriata foliis longissimis, composita

composita spiculis 5—6. pluribusve sessilibus. Lana panicula longior rufa. Semina triquetra, utrinque acuta. Glumæ lanceolatae, ferrugineae, dorso linea elevata carinatae.

8. *ERIOPHORUM cyperinum*.—E. culmis teretibus, foliosis, panicula supradecomposita prolifera, spiculis subternis. *Linn. Sp. Pl. tom. 1. p. 313.*—Lana gilva, spiculis vix longior.

29.

MÜHLENBERGIA.—Of this genus we know two species, of which we shall have complete descriptions in the next number of Mr. von Schreber's excellent work on Grasses. They are

1. *MÜHLENBERGIA diffusa*.—M. culmo diffuso foliis linearibus angustis, ligula obsoleta, panicula coarctata. *M. diffusa. Sp. Pl. tom. 1. p. 320.*
2. *MÜHLENBERGIA erecta*.—M. culmo erecto, foliis lanceolatis, ligula oblonga barbata, panicula laxa. *Hab. in America boreali. 4.*

30.

Between *Milium paradoxum* and *M. villosum* *Sp. Pl. tom. 1. p. 360-361*, is to be placed

MILIUM caerulescens.—M. floribus paniculatis aristatis, aristis gluma brevioribus. *Schousboe Marocc. pars 1. p. 34.*

M. panicula laxa; pedunculis capillaribus; calyce exteriori membranaceo-acuto; interiore subaristato. Desfont. Atl. 1. p. 66. t. 12.

Hab. circa urbem Sanctæ Crucis. SCHOUSBOE.

31.

According to the specimens communicated to me by the Rev. Dr. Koch, *Agrostis sylvatica* (Pollich Palat. n. 73.) is a mere variety of *Agrostis stolonifera* L., and cannot there-

fore be given as synonym to *AGROSTIS sylvatica* Spec. Pl. tom. 1. p. 371.

32.

Between *Melica nutans* and *M. uniflora* Sp. Pl. tom. 1. p. 382-383, is to be inserted

MELICA pyramidalis.—*M. petalis imberbibus, panicula patente pyramidata, foliis apice involutis, subasperis. Schousboe Marocco, pars 1. p. 37.*

M. panicula pyramidali laxa, foliis linearibus angustis, apice involutis. Poiret Iter 2. p. 96. (excl. synonymo Morisoni!)

M. ramosa Villars Delph. 2. p. 91.

Hab. in montosis fruticetis regionis tingitanæ—Media inter *M. nutantem* et *unifloram*; ad priorem tamen proxime accedit. Panicula racemosa secunda. Flores nutantes.

33.

UNIOLA paniculata, spiculis ovatis. Sp. Pl. tom. 1. p. 406.

Plukenet's figure (Alm. tab. 32. fig. 6.) is bad: the leaves, which ought to be rather broad and flat, are represented as *folia involuta*.

[To be continued.]

R E V I E W.

IX. *A Description of the Genus Pinus, illustrated with Figures, Directions relative to the Cultivation, and Remarks on the Uses of the several Species, by AYLMER BOURKE LAMBERT, Esq. F. R. S. F. S. A. V. P. L. S.* London, printed for J. White, at Horace's Head, Fleet-street, 1803. Pag. 86. Pl. 38. Large Folio. Price Ten Guineas.

IN reviewing this splendid production, in which so much elegance is united with a great portion of utility, it is impossible not to pay a tribute of respect both to the author, who has bestowed such attention and labour on a subject of so very intricate investigation, and to the artists, whose talents have certainly rendered it one of the most magnificent monographs extant. Mr. Lambert has, by this publication, supplied a great deficiency in the catalogue of botanical works; for though there exist, in several languages, valuable materials for a history of the Pines, yet these are widely dispersed, and scarcely any of the figures of them in different works can be said to be above, while most of them are far beneath, mediocrity: no genus, therefore, stood in greater need of revision than that of *Pinus*. But if such an undertaking be attended with great difficulties, even in regions where many of the species are indigenous, those difficulties must be increased, and success be the more meritorious, in a country whose Flora does not call one her own. Mr. Lambert surmounted this obstacle by applying for several years to every source of information within his reach, particularly to the rich gardens of Kew;

Pains-

Pains-hill, the seats of different noblemen in this country, as those of the late Duke of Argyle at Whitton, of the Duke of Northumberland at Sion, of the Earl of Coventry at Croom, the plantations of Lord Rivers at Stratfieldsay, as also the garden of the late Peter Collinson (now Mr. Salisbury's) at Mill-hill. By availing himself of these repositories with that laudable zeal which marks his botanical pursuits, Mr. Lambert has been enabled to present the lover of Dendrology with the description of and remarks on thirty-three species, represented in thirty-eight plates, with a degree of elegance, taste, and scientific accuracy, not inferior to the first-rate productions of this kind. Except three executed by Mr. Francis Bauer of Kew, all the drawings are by Mr. Ferdinand Bauer, the artist who accompanied Dr. Sibthorp on his tour in Greece, and who is now employed, as botanical painter, under Captain Flinders, on a voyage for surveying the coast of New Holland. Twenty-three of the plates are engraved by Mr. Warner, twelve by the late Mr. M'Kenzie, two by Mr. Barlow, and one by M. Queiroz, a pupil of Bartolozzi. But though the plain engravings are really of a superior kind, the chief praise, in speaking of the excellence of the representations, is due to the coloured copies, executed by Mr. Hooker, a pupil of Mr. Fr. Bauer, in such style as to give the effect of original paintings. We are, however, sorry that the latter can only be purchased by the happy few, since forty guineas for the history of a single vegetable genus is far from being *cujusvis crumena*. So much for the figures. Of the text it is but justice to say, that it answers completely our best expectation. The new specific characters are precise, and the Latin descriptions elegant, clear, and copious: we cannot, however, avoid saying that the observations on the cultivation and use of the different species may possibly not stand the test of rigid criticism, at least may be deemed incomplete, as Mr. L. has not sufficiently availed himself of the information of other writers upon

upon this subject. Something might also be said against the arrangement of the synonymy, and the total inattention to what relates to the physiology of these trees, &c. : but "*ubi plurima nitent*" it would appear an invidious task for us to point out defects, which the author, we trust, will know how to remedy himself in the continuation which he promises in the preface to this work. It cannot be deemed unprofitable to lay before our readers an abstract of the contents of the work, to which we shall add occasional remarks.

The species are arranged as follows :—1. those with several leaves from a common sheath (18 species); 2. those with solitary leaves surrounding the branches (10 species); 3. those with numerous leaves in bundles from a common sheath (4 species, besides one subjoined as dubious, the *Dammara alba* of Rumpf.).

* *foliis pluribus ex eadem basi vaginali* :

1. *PINUS SYLVESTRIS* Linn.—*P. foliis geminis, rigidis, strobilis junioribus pedunculatis recurvis dependentibus, antherarum crista exigua*. Tab. 1.—This highly useful species, from which the red deal is obtained, inhabits more generally the northern parts of Europe, but is also found further to the south, and in Scotland, whence it is commonly called the Scotch fir. Miller describes the Scotch tree as a distinct species under the name of *P. rubra*. Mr. L. is justly surprised that it is not more cultivated on waste ground in England. According to his own observations it thrives least on chalky land, but even there it will grow. From a note to *P. alba* we learn that in some parts of Ireland the bogs are almost entirely filled with the old roots of *P. sylvestris*; they are dug up, and converted into ropes that stand dampness much better than those made of hemp; and the wood itself is sold in the streets of Dublin by the name of bog-wood. It ought not to be passed un-

noticed

noticed here, that Oelhaven asserts that he has frequently observed the male and female flowers of this species upon different trees, and we have no reason to distrust the observation of this excellent dendrologist; but Gleichen's representing the male and female flowers as in the same catkin, the former below and the latter above, appears to be erroneous. Thunberg imagined he had met with *P. sylvestris* in Japan; but as he describes the branches as horizontal, Mr. Willdenow is inclined to consider it rather as a different species.

2. *PINUS PUMILIO*.—*P. foliis geminis abbreviatis strictis, strobilis ovatis obtusis minimis: junioribus sessilibus erectis.* Tab. 2.—The Mugho or mountain pine, the smallest of the genus, is a native of the high mountainous parts of the south of Europe. It is very nearly related to *Pinus sylvestris*; but its cones, according to Mr. L's observations, grow erect, and are sessile till they are above one year old, when they become horizontal: those of *sylvestris* have long stalks, and become pendent soon after impregnation. In Germany and Hungary the Mugho pine is called *Krummholz* (crooked wood), but it is more than probable that two distinct species are comprehended under this appellation. The essential oil obtained from its resin is called *Krumholz-oil*.

3. *PINUS BANKSIANA* Lamb.—*P. foliis geminis divaricatis obliquis, strobilis recurvis tortis, antherarum crista dilatata.* Tab. 3.—The Labrador or Hudson's-bay pine. This species, which has never been noticed in any work, except in the Hortus Kewensis (as *P. sylvestris divaricata* δ .), is strikingly distinct from all other pines by its opposite cones, curved towards each other in the manner of the horns of a ram. We fully subscribe to Mr. L's opinion, that this species cannot be a variety of *P. sylvestris*, even if there were no other objection than its being an American tree.

tree. From the same reason we suspect that the American *Tilia alba* of Hort. Kew. is distinct from the *Tilia alba* of the *Plantæ rariores Hungariæ*.

4. *PINUS PINASTER* Hort. Kew.—*P. foliis geminis elongatis, strobilis verticillatis confertis ovatis sessilibus pendulis, antherarum crista rotundata*. Tab. 4.—The pinaster is a native of Italy and the south of France. The first planted in England, says Mr. Lambert, was in Bishop Compton's garden at Fulham, where it is still growing and in a healthy state: we find it however mentioned in *Hortus Kewensis*, that it was cultivated so early as 1596 by Gerarde. Linnæus considered this species as a variety of *P. sylvestris*, from which it is, however, distinct, not only by its large cones in clusters, but also by the horizontal growth of its branches, which are moreover at wider distances; and the leaves and their sheaths are considerably longer than in the Scotch fir. Mr. Lambert's excellent figures were made, the one from a fine tree at Kew; the other, exhibiting a large branch with ripe cones, from a drawing by Ehret in the Banksian library.

5. *PINUS PINEA* Linn.—*P. foliis geminis, strobilis ovatis maximis, seminum alis abbreviatissimis, antherarum crista dentato-lacera*. Tab. 6, 7, 8.—The stone pine is strikingly distinct from the neighbouring species by its very thick ovate-roundish cones, often acquiring the size and shape of a moderate pine-apple, a name undoubtedly given to the fruit of the ananas from this similarity. The kernels which they contain are not only in great request in Italy, Spain, and the rest of the south of Europe, where this tree grows spontaneously, but are likewise imported into foreign countries, as a very palatable dessert, for which purpose the tree is frequently cultivated. The *Pinhao molar* of the Portuguese, and the *Pignuolo molese* of the Neapolitans, are said to be varieties of this species. The three plates illustrative of this species are excellent: the first of them represents
branches

branches with flowers and with fruits of two years growth; the second, some perfect cones of three and four years growth; the third (which, as not conveying additional information, might have been very well spared), another perfect cone purchased in a London shop.

6. PINUS MARITIMA.—*P. foliis geminis tenuissimis, strobilis ovato-conicis glaberrimis solitariis pedunculatis*. Tab. 9, 10.—The species here described and figured, under the name of the maritime pine, appears to us to stand in need of attentive revision. It is *P. sylvestris* var. *maritima* Hort. Kew., but not the same with Duroi's *P. maritima* b., in which the cones are never solitary, but 2—3 surrounding the branch. Of Mr. L's plates, the one represents a branch with male flowers from the royal gardens at Kew; the other, a branch from a specimen in the Sherardian herbarium, with cones, which are smooth, glossy, and hanging downwards. To these is added a cone which Mr. L. obtained at Sion-house, but which is not very like those of the Sherardian specimen. To this latter obviously belong the scales and seeds exhibited upon the tenth plate, though they are disposed there as if belonging to the Sherardian cone; a mistake not corrected in the explanation of the plates.

7. PINUS HALEPENSIS H. Kew.—*P. foliis geminis tenuissimis, strobilis ovato-oblongis reflexis lævibus solitariis pedunculatis*. Tab. 11.—Mr. L's figure of the Syrian pine (which is also said to be found in the maritime situations of southern France) is taken from a specimen in the Sherardian herbarium.

8. PINUS MASSONIANA Lamb.—*P. foliis geminis tenuissimis longissimis; vagina abbreviata, antherarum crista dentato-lacera*. Tab. 12.—This fine long-leaved species is a native of China: the specimen from which the drawing is taken was sent by Mr. Masson from the Cape, where it was raised from seeds. Mr. Lambert has not been able to obtain

obtain the fruit, nor any information respecting it. What are described here as stipules might more properly have been called bractes; for they appear to be situated among the amenta exclusively.

9. *PINUS INOPS* H. Kew.—*P. foliis geminis, strobilis recurvis oblongo-conicis longitudine foliorum; aculeis squamarum subulatis rectis*. Tab. 13.—This species, commonly called in England the Jersey pine, is the *P. virginiana* of the botanists: the name of *inops*, given to it by the author of Hortus Kewensis, is preferable on account of its appearance, which is rather stunted and crooked, as well as from its not being confined to Virginia, but found in most provinces of North America. Mr. Lambert states, that never more than two leaves occupy one sheath; but Dr. Pott has observed them in three, and sometimes single. This pine is not much esteemed, except for preparing pitch and tar, which it yields abundantly in its native country. What Kalm observes, in his Travels in N. America, is rather remarkable—that in the heat of the summer the cattle resort to its shade in preference to that of any other tree, although affording much more shade by their foliage.

10. *PINUS RESINOSA* H. Kew.—*P. foliis geminis, strobilis ovato-conicis sessilibus ternis; squamis medio dilatatis inermibus*. Tab. 14.—Besides the characters here given of the pitch pine, there is another, viz. the great length of the sheaths of the leaves, which is nearly an inch. It grows naturally almost all over North America. Mr. Lambert recommends it to more general cultivation on the score of its elegant appearance, and the fragrance of its resin; but not much can be expected from it as timber.

11. *PINUS VARIABILIS* Lamb.—*P. foliis binatis ternatisque, strobilis ovato-conicis subsolitariis; squamarum aculeis incurvis*. Tab. 15.—This is *Pinus tæda variabilis* γ. Hort. Kew., and *P. echinata* of Miller. Duroi and Mönch consider it as a variety of the Jersey pine, to which it appears

pears to be nearly related; and Dr. Pott states that he has not found sufficient or constant any of the characters, upon the strength of which it has been made a distinct species. This scarce species stands in need of re-examination.

12. *PINUS TÆDA* Linn.—*P. foliis ternis elongatis, strobilis deflexis; spinis inflexis, vagina foliorum elongata.* Tab. 16, 17.—Frankincense pine. This species, which has its name from the strong-scented turpentine, tar and pitch, which it yields, is a native of North America, where it grows near the sea-coast, and on plains too poor to afford much nourishment; whence, as Wangerheim informs us, these trees are low, and acquire but moderate size. It appears, indeed, that the dryness of the soil is less favourable to the growth of this species than to that of many others. The frankincense pines in the well-known garden of Count Veltheim, at Harbke, have attained, in 33 years, the height of 38 feet, and a diameter of four.—The two plates illustrative of this species represent specimens brought from America by Fraser, and from a tree in the garden at Sion-house.

13. *PINUS RIGIDA* Mill.—*P. foliis ternis, strobilis ovatis confertis; squamarum spinis reflexis, vagina foliorum abbreviata.* Tab. 18, 19.—Miller was the first who distinguished this from the preceding species; in which he was followed by Duroi. According to Mr. Lambert's observations, the cones of *Pinus Tæda* have a much looser texture, and are more slightly attached to the branches: the length of the sheaths, and the incurvature of the spines of the scales, are likewise more considerable in that species than in *P. rigida*.

14. *PINUS PALUSTRIS* Mill.—*P. foliis ternis longissimis, strobilis subcylindræis muricatis, stipulis pinnatifidis ramentaceis persistentibus.* Tab. 20.—This singularly fine species, which is only found natural in the more moderate climes of North America in moist boggy places, is at once known by its leaves of more than a foot in length, standing
closest

closest towards the termination of the branches, and by its long beautiful cones. It grows to the height of from 40 to 50 feet, but its wood is soft and light, and contains but little resinous matter. Mr. L. has not had an opportunity of seeing the female flowers, but has represented, together with a fine male branch, a cone which is not equalled in length by that of any other species.

15. *PINUS LONGIFOLIA* Roxb.—*P. foliis ternis tenuissimis longissimis, vagina elongata, stipulis integerrimis deciduis, antherarum crista convexa integruscula*. Tab. 21.—Hitherto the swamp pine was looked upon as having of all its congeners the longest leaves; but those of this new East Indian species exceed them by several inches. According to the account given of it in Dr. Roxburgh's manuscripts, it is found on the high mountains of Napaul, where it grows to a considerable size: in the gardens about Calcutta, however, where some trees have been reared from seeds brought from that country, it is only met with in a low state. The threefold, long, smooth, filiform, and generally pendulous leaves disposed round the termination of the smaller branches, and the male amenta collected in a bundle on the top of the branchlets, distinguish this beautiful pine, even at first sight, from all others.

16. *PINUS STROBUS* Linn.—*P. foliis quinis, strobilis foliis longioribus cylindraceis lævigatis, antherarum crista gemina subulata minima*. Tab. 22.—The Weymouth pine (thus called from Lord Weymouth, on whose estate in Wiltshire it was first cultivated with great success) is a native of the colder regions of North America, New York, New England, Nova Scotia, and Canada. The principal woods of it are on the shores of Funday-Bay in Nova Scotia, and of Casco-Bay on the eastern side of Massachusetts-Bay; as also on the shores of the rivers Piskataqua and Merrimack (in New Hampshire). The

whole tract, from the extreme northern side of the river St. Lawrence, towards Montreal, and the shores of the Lake Champlain, likewise abounds in this species. Though the Weymouth pine attains the height of 200 feet, DuRoi is of opinion that the wood can be of little use, on account of the many knots it contains. We know, however, very well from Wangenheim and others, that its timber does not only completely answer all the purposes for house-building, but likewise for all sorts of masts and yards, planking, &c. The last mentioned author saw two masts, intended for seventy-four gun ships, 108 feet each in length. For hulls of ships, and for under-ground work, its wood is, however, less desirable, as it does not bear moisture for any considerable time without decaying. The smooth bark of the Weymouth pine, rarely met among the species of this genus, is very characteristic. The resin which it yields has a fine scent; and the scales of the cones are covered with it; which gives them a singular appearance, as is well expressed in the plate. It might also have been noticed here, that Mr. Scheidlin of Wirtemberg has succeeded in multiplying this valuable species very expeditiously, by ingrafting branches on the stems of *Pinus sylvestris*.

17. *PINUS CEMBRA* Linn.—*P. foliis quinis, strobilis ovalis seminum alis oblitteratis, antherarum crista reniformi crenata*. Tab. 23, 24.—The Cembra pine, to us one of the handsomest of the genus, is often confounded with *Pinus pinea*; not, indeed, on account of any similarity in the structure of their parts, but because the kernels of both species are used for food. It grows naturally in Siberia, the alpine parts of Tyrol, and also in Switzerland. The Swiss tree is different from that of Siberia, according to Haller, and we are much inclined to the same opinion. As the Cembra pine is very hardy, Mr. L. thinks it might properly

properly be planted on our bleak and mountainous lands, especially in the proximity of the sea: Linnæus himself likewise recommended its cultivation on the high and bald mountains of Lapland. Its timber has a finer grain than common deal, and a very pleasant smell, which is not, however, perceived in the Russian Cembra: Both the flowers and cones have a most beautiful appearance: the latter, which are two inches in diameter, and three inches long, have, before they arrive at maturity, a bloom upon them resembling that of a ripe plum: The nuts, which are called *arren-nüsse* in Switzerland, (we never heard of *aphernouilli*, which is a corruption seemingly taken up by Mr. L. from Harte's Husbandry,) are triangular, and easily cracked: the kernels they contain, which afford a delicious fruit, and serve for medicinal purposes, are about the size of a large pea, and have the whiteness with the agreeable taste of almonds. One of the plates represents branches with male flowers and ripe cones, and very accurate dissections of the seed; the other, the unripe blue cones.

18. *PINUS OCCIDENTALIS* Swartz.—*P. foliis quinis longissimis margine scabris, strobilis oblongis; squamis apice truncatis*.—As Mr. L. has not had an opportunity of seeing complete specimens of this species, of which Professor Swartz himself has only examined the male flowers, no plate is given of it. We add both to Professor Swartz's and Mr. Lambert's descriptions, that the leaves are not constantly by fives, but likewise by threes.

* * *Foliis solitariis ramis ambientibus.*

19. *PINUS ABIES* Linn.—*P. foliis solitariis tetragonis, strobilis cylindraceis; squamis rhombeis complanatis margine repandis erosis*. Tab. 25.—What we find here relative to the history of this important species, and its application, is rather too laconic: as for its culture, it is passed over in silence. The plate exhibits a very exact and beautiful representation.

20. *PINUS ALBA* Hort. Kew.—*P. foliis solitariis tetragonis incurvis, strobilis subcylindræis laxis; squamis ovatis integerrimis*. Tab. 26.—The white spruce fir, so called from the greater whiteness of its bark, does not thrive in warm climates, and is, therefore, in America, not found further south than 43° N. lat. It produces excellent timber, and approaches the foregoing species in growth. In the arboretum at Harbke, trees of 33 years had acquired 3 feet 8 inches in circumference, 50 feet in height, and 20 feet in the diameter of the expansion of the branches. The white spruce is also one of the most ornamental species of its genus, and highly deserves to be recommended for cultivation. It is however much more advisable to plant young trees, than to raise them from seeds, which is attended with much difficulty; for, though they come up and look sound the first year, they often perish in the second or third cold winter. Many heaths and waste lands in Great Britain would, in Mr. L's opinion, be very proper for the cultivation of this species.—*P. alba* is well known to be used for preparing the essence of spruce, a detailed account of which is given by Dr. Maton in his dissertation at the end of this work.—Mr. L. remarks that this species, when young and in great vigour, will sometimes bear cones of a large size, with numerous small squamæ, and a branch or shoot growing out of their tops.

21. *PINUS NIGRA* H. Kew.—*P. foliis solitariis tetragonis rectis strictis, strobilis ovatis; squamis ellipticis margine undulatis erosis*. Tab. 27.—The black-spruce is found with the foregoing species, and is also made use of in the preparation of spruce beer. This tree, which in its native soil is from 30—40 feet high, may be easily known at first sight from *P. alba*, by the blackish colour of its branches, and the dark purple cones. We find it not noticed in the description, that the branches, especially the younger ones, are mostly covered with short hairs. Dr. Pott of Brunswick mentions

mentions a variety, received at Harbke by the name of *Pinus chinensis*: it is of a straighter growth, and furnished with smaller leaves. Another spruce fir, and likewise from North America, is:

22. *PINUS RUBRA* Wangerh.—*P. foliis solitariis subulatis acuminatis, strobilis oblongis obtusis; squamis rotundatis subbilobis margine integris*. Tab. 28.—According to the description, the cones of the Newfoundland red spruce fir differ from those of *P. alba* in being rather thicker; the scales are of a firmer texture, with a deep notch, and longer than those of the black spruce, as also of a redder colour. These characters may, indeed, as Mr. L. observes, distinguish at once the red from the black spruce; but still they appear not quite sufficient to found a specific difference upon: so that Miller and Duroi can scarcely be blamed for not separating them.

23. *PINUS ORIENTALIS* Linn.—*P. foliis solitariis tetragonis, strobilis ovato-cylindraccis; squamis rhombeis*. Tab. 29.—This is the *Abies folio brevi et tetragono, fructu minimo deorsum inflexo*, of Tournefort, who discovered it in the neighbourhood of Trebisende, upon the Black Sea, where it is known by the name of *Ελάτη*. Mr. Lambert has not had an opportunity of seeing a specimen of this rare species; but he has obtained a copy of the drawing made by Aubriet under the direction of Tournefort, and now in the possession of Jussieu. So well authenticated a drawing is, indeed, a valuable addition to the work; but we cannot approve of Mr. Lambert's having (contrary to his usual caution) subjoined the representations of two cones from China, on a supposition that they belong to Tournefort's pine. The cones in Aubriet's drawing are furnished with long stalks, pretty like those of the white spruce: those from China are completely sessile.

24. *PINUS PICEA* Linn.—*P. foliis solitariis planis subsecundis, strobilis cylindraccis erectis, bracteolis elongatis, an-*

therarum crista bicorni. Tab. 30.—On account of the fine glaucous colour of the under surface of the leaves, this species has obtained the name of the silver fir. It grows naturally in the mountainous parts of Switzerland, Thuringia, Suabia, &c.; and according to Gmelin it is also found in Siberia, but not beyond 50° N. lat. The silver fir is easily known from others by the characteristic form of its oblong erect cones, the scales of which are toothed at their sides, and grown together at their base with a persistent lanceolate bracteole, which runs out into a horizontal or reflected point. Besides the use made of the light and pliable wood of this species, for the manufacturing of different tools and for purposes of building, it yields an excellent turpentine; nor ought it to be omitted here, that its bark contains a good deal of tannine principle.—One of the tallest and finest silver firs Mr. Lambert saw in the garden of the late Duke of Argyle, now the property of Mr. Gosling.

25. *PINUS BALSAMEA* Linn.—*P. foliis solitariis planis subsecundis, strobilis cylindraccis erectis, bracteolis abbreviatis, antherarum crista mutica*. Tab. 31.—The balm of Gilead fir is a native of North America, where it attains a considerable height. It has much the habit of the silver fir; but its leaves are rather shorter, and less glaucous beneath. The very showy deep purple cones are generally of the size of the last mentioned species, and equally erect: but the bracteolæ of the squamæ are shorter, and their point does not project considerably; they secrete a whitish transparent resin, exceedingly well expressed in the coloured representation, which was taken from a specimen procured at Longleat, Wilts, the seat of the Marquis of Bath, where Mr. L. has seen the tree in great perfection. There are also very large trees of it at Wooburn and Warwick Castle, which are said to be more than twenty years old; contrary to what was supposed by Mr. Lambert,—and also
by

by Miller, at least in the earlier editions of his work. This species has likewise succeeded very well in Germany : Dr. Pott observes that the stems of the balm of Gilead firs at Harbke have acquired 2 feet 10 inches in circumference, 44 feet in height, and are of very straight growth. The resin taken from the vesicles found between the bark and the wood of *P. balsamea* is often sold under the name of balm of Gilead ; it is however nothing but common Canada balsam.

26. *PINUS CANADENSIS* Lind.—*P. foliis solitariis planis denticulatis subdistichis, strobilis ovatis terminalibus vix folio longioribus*. Tab. 32.—The account we find here given of this species is rather short. No mention is made of the use to which it is applied in America ; though we know from Wangenheim, that its wood affords very good timber and fuel, and that, in the more southern states of America, the young shoots are made use of for brewing beer. This species is generally called Hemlock spruce, a name not mentioned in the work before us.

27. *PINUS TAXIFOLIA* Lamb.—*P. foliis solitariis planis integerrimis, strobilis oblongis, antheris inflato-didymis*. Tab. 33.—The Nootka fir, as Mr. L. calls this species, was brought from the north-west coast of America by Mr. Menzies. It approaches to the preceding species : but its leaves are larger, with margins entire ; the flowers are disposed in much larger heads with fringed bractæ : cones unknown. The figure was taken from a specimen in the Banksian herbarium : it is very faithful, except for the magnified anthers, and the two detached leaves ; which latter are erroneously figured as being petioled, whereas they are only attenuated at the base, with a slight twist.

28. *PINUS LANCEOLATA* Lamb.—*P. foliis solitariis lanceolatis planis patentibus, strobilis globosis ; squamis acuminatis*. Tab. 34.—The lanceolate and acuminate leaves of this singular Chinese species are the broadest of any other in the genus, if we except the *Dammara* to be mentioned

hereafter, but which may possibly turn out to belong to another genus of the Coniferae. The cones are globular,—a character well expressed in Plukenet's figure,—but the shape of the leaves is quite different from that in the species here described. Mr. Lambert's very characteristic figure was taken from a specimen in the Banksian herbarium, to which it was given by Sir G. L. Staunton,

*** foliis numerosis fasciculatis, ex una basi vaginali.

29. PINUS LARIX L.—*P. foliis fasciculatis deciduis, strobilis ovato-oblongis, squamarum marginibus reflexis laceris, bracteolis panduriformibus*. Tab. 35.—The figure is very characteristic and instructive. Mr. L. finds, in Professor Martyn's new edition of Miller's Dictionary, the subject of the Larch so completely treated upon, that he refers the reader to that work.

30. PINUS PENDULA.—*P. foliis fasciculatis deciduis, strobilis oblongis; squamarum marginibus inflexis, bracteolis panduriformibus acumine attenuato*. Tab. 36.—This is the black larch according to Mr. Lambert, and *P. intermedia* of Pott, who quotes *P. Larix rubra* of Marshall, giving the synonym of *P. Larix nigra* Marsh. to the following species, between which and the common larch it is intermediate.

31. PINUS MICROCARPA Lamb.—*P. foliis fasciculatis deciduis, strobilis subrotundis paucifloris; squamis inflexis, bracteolis ellipticis obtuse acuminatis*. Tab. 37.—This is *P. laricina* of Duroi; according to Mr. Lambert the red larch. It is a native of North America as well as the foregoing species, to which it approaches very near; the principal difference lying in the figure of the *bracteolæ*, and the remarkable smallness of its cones, that are scarcely half an inch in length.

32. PINUS CEDRUS Linn.—*P. foliis fasciculatis perennantibus, strobilis ovatis obtusis erectis; squamis adpressis rotundatis*. We were much disappointed at not finding a figure to the account of this most interesting species,—an omission

omission which Mr. L. excuses on account of the one already existing of the cedar of Lebanon in Ehret's *Plantæ Selectæ* published by Trew; but which, we think, does not render a new drawing superfluous, particularly as that work is not frequently met with. For those who are possessed of it we correct an error of the press in the quotation: instead of "tab. 1, 4, 28, 60, 61," read pag. 28. tab. 60 & 61.

32. *PINUS DAMMARA* Lamb.—*P. foliis oppositis elliptico-lanceolatis striatis*. Tab 38.—As an appendix to the rest, we are here made acquainted with one of those remarkable trees that yield the Dammaræ; a resinous substance, used for several purposes in different parts of Asia. Both description and drawings are from a specimen without flowers, and from some fragments of the cones in the Banksian collection. This rare tree inhabits the high mountains of Amboyna, where it grows to a very considerable height. Its leaves are opposite, ovate, lance-shaped, from three to five inches long, an inch or upwards in breadth; they are without a mid-rib, but longitudinally striated; and thus constitute as it were a number of the common *folia accrosa* joined sideways. There is no question that this Dammaræ is of the family of *Coniferae*: we are, however, as yet too imperfectly acquainted with its fructification to be authorised to call it a species of *Pinus*: it seems to us more probable that it may turn out a congener of that remarkable tree, the Rasamala of Java, called *Lignum papuanum* by Rumpf, of which we shall, perhaps, have an opportunity to say more in a future number of our *Annals*. We conclude with observing, that, strange as it may appear, Loureiro's *PINUS Abies* (*Fl. cochinch.* p. 379.) is nothing else but Mr. Lambert's *Pinus Dammara*, or at least a congener of it. That good man had likely never seen a European pine, and hence mistook the sense of the Linnean specific difference of *Abies*. His *Pinus sylvestris* is likewise

wise far from being the common fir ; for he describes the leaves as being half a foot long.

Besides two instructive letters—the one from Mr. Davis relative to the timber yielded by various species of pines, the other from the treasurer of the Linnean society, on the subject of insects destructive to these trees—we find appended to this work a very complete “dissertation on the medicinal and other uses of various substances prepared from trees of the genus *Pinus*,” which, as might be expected from the pen of Dr. Maton, is executed with great judgment and precision. The Doctor treats first on the medicinal properties of terebinthinate substances in general ; and then proceeds to record systematically the history of the substances yielded by the several species, enlarging, at the same time, on the different processes of preparing them, their composition, &c. Thus, for instance, speaking of the Scotch fir, he treats, in separate heads, on the common turpentine, the extract of the juice of the fir, its essential oil, the common resin, the black resin or colophony, tar, tar water, pitch, lampblack, and bark bread.

X. *Jardin de la Malmaison, par E. P. VENTENAT, de l'Institut National de France, l'un des Conservateurs de la Bibliothèque du Panthéon* (with the motto, “*Si canimus sylvas, sylvæ sint Consule dignæ.*”). Livraison I—III. À Paris, de l'Imprimerie de Crapelet. An ix. (1803) Fol. maj.

IF we may form a judgment from the first numbers, this work, which is intended to describe and figure the rare plants of Madame Bonaparte's garden at Malmaison, will be worthy to be placed by the side of the other well received botanical productions of its indefatigable author. The plan followed in the arrangement of the text is exactly the same with that of his “*Plantes du Jardin de Cels* : ”

the specific and sometimes the improved generic character of each plant in Latin is followed by a detailed description of all the parts in French, to which are annexed observations, which, upon the whole, bespeak much judgment, as well as a very intimate acquaintance with the subject; and frequently tend to illustrate some important point in the natural arrangement of plants, for which M. Ventenat is a great advocate. The plates, done from paintings of Redouté, are not uncoloured stroke engravings like those of the before-mentioned work of this author, but in the dotted manner printed off in colours, and afterwards finished; by which, indeed, a soft and picturesque effect is produced, but very frequently at the expense of truth, both with regard to the colour and surface of the parts: the former, especially the green, admitting of very little variety in the tints; the latter never exhibiting those various degrees of roughness, smoothness, or pubescence, so admirably expressed in the originals or coloured prints of Bauer and Redouté, or even in the plain engravings of the *Flora Atlantica*, *Plantes du Jardin de Cels*, &c. Upon the whole, it cannot however be denied that the execution of the plates is far beyond any thing we have seen in this style.

Each number of this work contains six plates, with as many leaves of letter-press displaying great typographical elegance. We shall here make our readers acquainted with the contents of the three first numbers.

1. *GORDONIA pubescens*: foliis obovatis, laxè serratis, subtus pubescentibus; pedunculis brevissimis; fructibus globosis.—This beautiful shrub, a native of South Carolina, stood in great need of a good and accurate delineation: the figure here given of it is excellent. We see scarcely any difference between this and *Gordonia Franklinia*.

2. *XERANTHEMUM bracteatum*: foliis lanceolatis, repandis, scabriusculis; floribus solitariis, terminalibus, bracteatis.—A new species from New Holland, with lance-shaped

shaped undulated leaves, and large shining yellow flowers furnished with long bractes. *St. Louis Bank*

3. *EUPATORIUM Aya-pana* : foliis lanceolatis, integerrimis, subtrinerviis ; inferioribus oppositis, superioribus alternis ; calycibus inæqualibus, multifloris.—This species, which, on account of its lively purple flowers disposed in axillary and terminal corymbs, is one of the finest of the genus, is found in South America at the right border of the Amazon river, and was also lately introduced by Captain Baudin into the Isle of France. The Aya-pana lately attracted the attention of the world, through the praises lavished on it in the French journals as a wonderful remedy against the bite of snakes, dropsies, dangerous wounds, &c. : subsequent observations appear, however, to prove that its virtues have been much over-rated. The compliment in the dedication to Madame Bonaparte appears to be borrowed from this plant.

4. *MELALEUCA gnidiæfolia* : foliis lanceolatis trinerviis, ramulis floriferis lateralibus paucifloris ; filamentis antice remotis.—Though it is here observed that this species, a native of New Holland, is not among those described by Dr. Smith in the third volume of the Linnean Transactions, yet we find that it is this gentleman's *MELALEUCA thymifolia*, specimens of which we have carefully compared with the description and drawing of M. Ventenat, which are taken from an imperfect specimen.

5. *METROSIDEROS anomala* : foliis oppositis, subsessilibus, cordato-ovatis, impunctatis ; ramulis, pedunculis, calycibusque hispidis ; floribus solitariis, terminalibus.—This also, we find, is one of Dr. Smith's species, namely, *M. hispida*. M. Ventenat says it is distinct from all the other species with opposite leaves, by the hairiness of the upper part of the stalks, by its coriaceous leaves and solitary flowers : but the two first characters it has in common with Dr. Smith's plant ; the latter may be accidental ; and, indeed, both
1
drawing

drawing and description appear to be made from a plant at the first time of its flowering. There is no doubt that it is also the same plant with *ANGOPHORA ovata* of Cavanilles; for, though this botanist describes only one-seeded locuments, and M. Ventenat observed several ovula in each cell of the germen of his *M. anomala*, it is well known that in this family the abortion of the seeds is not unfrequent. Cavanilles founds the distinction of *Metrosideros* and his *Angophora* chiefly upon the seeds of the latter being few and roundish; those of the former many, small, and wedgeform: but this can be scarcely deemed sufficient for establishing a genus. Of greater importance, and indeed very anomalous, is, that the petals of *M. hispida* are as it were conferruminated with the laciniae of the calyx, and staminiferous: a circumstance we are surprised not to find pointed out by Cavanilles in the generic character of his *Angophora*.

6. *NYMPHÆA cœrulea*: foliis cordato-subrotundis, repandis; laciniiis calycinis petalisque lanceolatis; antheris appendiculatis.—The blue Cape Nymphæa is well known in this country. We find it here observed, that the natural family of *Hydrocharides*, in Jussieu's work, contains several genera which ought to be transferred to the dicotyledonous plants, and Nymphæa among the number: the first step, however, should be to prove the embryo of the water lily to be of two lobes, which, for aught we know, has not hitherto been maintained by any botanist.

7. *CROWEA saligna*: caule ramisque triquetris, glabris; foliis alternis, lanceolatis, integerrimis; floribus solitariis, axillaribus.—In the character given here of this well-known genus of Dr. Smith, we find the germen described as *stipitate*; and a query added, whether this character might be employed to distinguish *Crowea* from nearly related genera of the natural order of *Rutaceæ*? We are at a loss to ac-

count

count for this, as it appears to us, erroneous observation of M. Ventenat, unless he considers the medullary part of the fleshy receptacle-like continuation of the calyx as a stipes; which cannot be done without confounding ideas. We never observed the calyx in that state in which it is exhibited in fig. 2. of the drawing.

8. *LANTANA nivea*: foliis ovato-lanceolatis, acuminatis, crenulatis; caule aculeato; capitulis hemisphaericis; bracteis linearibus.—This very handsome species, distinguished from its congeners by its light green leaves, and the disposition and white colour of the flowers, is stated to be a native of the East Indies, a part of the world where one should not have expected it. It was sent over to France by Messrs. Lee and Kennedy, of Hammersmith.

9. *CENTAUREA pumila*: subacaulis; calycibus simplicissimis, spinosis; foliis pinnatifidis, crassis, subtomentosis.—A native of Egypt, and very common about Alexandria: it approaches to *Centaurea acaulis* Linn., from which it is, however, distinct, by its fleshy leaves, and by the scales of the calyx being terminated by a long spine. Linnæus has described this species in the *Amœnitates Academicæ*; but we are sure that the synonym of Tournefort given there does not belong to it.

10. *NICOTIANA undulata*: foliis radicalibus subspathulatis; caulinis petiolatis, ovatis, undulatis, acuminatis, floribus obtusis. Seeds of the New Holland tobacco were sent from England to France. It has been since figured in the Botanical Magazine, under the above specific name; though Dr. Sims is of the same opinion with us that it is an improper one, as the leaves are very little waved.

11. *ANTIRRHINUM triornithophorum*: foliis verticillatis, lanceolatis; caulibus decumbentibus; racemo terminali, paucifloro; floribus maximis, pedunculatis.—A well known American species. Dr. Corrêa de Serra has assured M.

Ventenat

Ventenat that he had never found it in the south of Portugal: hence it is probable that the plant mentioned under this name by Vandelli, in Grisley's *Viridarium Lusitanicum*, is a different species.

12. *CAMPANULA Vinæflora*: foliis linearilanceolatis; caule tereti, ramosissimo; pedunculis terminalibus, elongatis, unifloris.—This is said to be *Campanula gracilis* of Forster, under which name it is also given in the Botanical Magazine.

13. *CORREA alba*: foliis ovatis, subtus albidis; floribus terminalibus subumbellatis; petalis basi conniventibus.—Both the description and figure given here of this well known plant are very exact.

14. *MELASTOMA cymosa*: foliis cordatis, ciliato-serrulatis, septemnerviis; cyma terminali; calycinis laciniis ovatis; staminibus alternis stipitatis.—Prof. Schrader of Göttingen was the first who described and figured this handsome species in his *Sertum Hannoveranum*. It approaches very near indeed to *Melastoma grandiflora* of Aublet; but differs from it chiefly in the construction of its stamina, which are of different lengths, and composed as it were of two pieces. It is a native of South America.

15. *MANULEA oppositiflora*: fruticosa pubescens; foliis oppositis, ovatis, inciso-serratis; pedunculis axillaribus, unifloris, longitudine foliorum.—M. Ventenat considers as the chief character, distinguishing *Manulea* from *Erinus*, the long tube of the flower, and its entire laciniae: the fruits of both have a dissepiment produced by the inflexion of the two valves; by which they are separated from *Buchnera*, which has *dissepimentum valvis contrarium*. This is the reason why the same botanist refers the latter genus to the natural order of Pediculares; the two former to that of the Scrophulariæ of Jussieu. The species here described is a native of the Cape of Good Hope, and approaches to

Buchnera

Buchnera pedunculata of Botanist's Repository, from which, however, it is distinct enough by its small flowers and construction of the fruit.

16. *BUNIAS spinosa* Linn. caule ramisque dichotomis, superne spinosis; spinis compositis floriferis.

17. *ROYENA ambigua* foliis obovatis villosiusculis, coriaceis; floribus pedunculatis, polyandris, polygynis; corollæ 6—7-fidæ laciniis obtusis.—An evergreen shrub from the Cape of Good Hope. M. Ventenat, not having had an opportunity of seeing the fruit, is dubious whether it is to be referred to *Royena* or *Diospyros*; to the latter of which it approaches, among other characters, by its polygamous flowers. As far as we can judge from a comparison of the description and drawing here given of *Royena ambigua*, it is scarcely any way different from *Royena polyandra* of the *Hortus Kewensis*.

18. *HEMEROCALLIS cœrulea*: foliis ovatis, acuminatis; bracteis membranaceis, brevibus; limbo calycis campanulato.—To distinguish as species the blue from the white day lily the following characters are proposed: *HEMEROCALLIS cœrulea*: leaves oval, pointed; stem above two feet, furnished its whole length with membranaceous short bractes; flowers blueish-violet; calyx tubulous in its lower, campanulated in its upper half.—*HEMEROCALLIS japonica*: leaves heart-shaped, acuminate; stem from one foot three to one foot eight inches, its lower part naked, the upper with some bractes of the same substance with the leaves, half the length of the tube; flowers white, calyx funnel-shaped. Besides these there may also exist distinguishing characters in their respective fruits.

XI. *Flora Batava; of afbeelding en beschryving van Nederlandsche Gewassen, naar het leeven geteekend, gegraveerd en gecouleurd door en onder opzicht van J. C. SEPP en Zoon, en beschreeven door JAN KOPS, Commissaris van Landbow, &c.—Flora Batava, ou Description des Plantes qui se trouvent dans les Pais Bas, avec des Figures en taille douce, dessinées, gravées et collorées (coloriées) d'après Nature, &c.—Amsterdam chez T. C. SEPP en Zoon.*
4to.

It is a just complaint against the iconographic botanical authors of several countries, that, by figuring over and over what has been well enough given before, they frequently disappoint the expectation of the purchasers of their works. This has not, however, as yet been the case in Holland; for, indeed, we were not acquainted with any publication exclusively dedicated to representations of the vegetables of this country. The work before us appears in numbers of either five or ten plates, and as many leaves of letter-press, written both in Dutch and French. It is calculated to give accurate figures and a short account of all the phænogamous plants found in the Batavian republic; those of the four-and-twentieth class of the Linnean system are for the present excluded from the plan, except the ferns: probably because the author is not very well acquainted with the former.

Though the chief merit of this Flora rests with the figures, which are very well executed by and under the direction of Mr. Sepp, (known to naturalists by his various delineations, and more particularly by his “*Neederlandsche Insecten*,”) yet the text cannot be said to be without its adequate share of utility: it is professedly a compilation from

the writings of other botanists, but executed with judgment and care. Mr. Kops gives first the generic character in Latin, translated word for word into Dutch, and accompanied with references to the dissections in the plate; the specific character comes next, with the varieties, loci natales, qualities, virtues, and æconomical uses, under distinct heads. With regard to the habitats, the author gives, besides some of his own observations, all that he found concerning them in de Gorter's *Flora Septem Provinciarum*, and in van Geuns's *spicilegium*. to that work; availing himself, at the same time, of the latter author's manuscripts, to which he has found access.

The French translation added to this work is by “*le Sieur Fallot*, (or, as he is called in another place, *Favrot*,) *M. D. à la Haye*,” but unfortunately it could scarcely have fallen into the hands of one less qualified for the task, not to say less acquainted with the first rudiments of French Grammar. His occasional remarks are not, however, altogether uninteresting: thus he adds to the description of *LEPIDIUM ruderale*, that he has not only often found, in the province of Utrecht, specimens with petals, (though exceedingly minute and caducous,) but also some with flowers containing two long and two small stamens; others again with six, four of which were longer.

Of the ten numbers before us, two contain ten, the rest five plates. . The plants hitherto figured are all indigenous to England.

MISCELLANEOUS ARTICLES.

DR. PULTENEY'S WRITINGS OF LINNÆUS.

DR. MATON is preparing for the press a new edition of the late Dr. Pulteney's *General View of the Writings of Linnæus* (now become very scarce), to which will be prefixed some memoirs of that eminent physician and naturalist himself, whose writings so essentially promoted the introduction and establishment of the Linnean system in England. This duty may be considered as naturally devolving upon Dr. Maton, from the friendship he enjoyed with Dr. Pulteney, and from the latter's bequest of his botanical manuscripts to him. Dr. Maton has also been so fortunate lately as to become possessed of the diary kept by Linnæus (which had been put into the hands of Archbishop Menander of Upsal), and a considerable collection of letters in his own handwriting. By means of these authentic documents, and the well known erudition and taste of Dr. Maton, the abovementioned work may certainly be made a much more correct and complete literary history of that illustrious naturalist than Dr. Pulteney's opportunities of information permitted. There are many particulars of Linnæus's *private* life in the diary, which have not hitherto been made known to the world, and which, by being recorded in the new edition, will render it still more interesting than the original performance, and also elucidate more fully his *literary* life. Besides, it is understood to form a part of Dr. Maton's plan to include an account of all the editions of the different works of Lin-

næus, and of all the considerable alterations of the system itself, which have appeared posteriorly to the date of Dr. Pulteney's volume: so that, in fact, the work which we are announcing will form, not only a concise analysis of the principles adopted by the great reformer of natural history, but also a view of the improvements (so far as they are referable to the *Systema Naturæ* as their source) and present state of that science. The medical part of Linnæus's writings has been too little studied in this country, but will we are confident be brought into more general notice, and undergo a more particular review, from the present editor.

JACQUIN'S HORTUS VINDOBONENSIS,

Containing three hundred figures of the plants cultivated in the botanic garden at Vienna, coloured in a masterly style, is now entirely out of print, and become exceeding scarce. It will be therefore no doubt acceptable intelligence to many, to hear that Mr. Frederic Guimpel, painter and engraver at Berlin, is about to publish a new and cheaper edition of this celebrated work. For the accommodation of purchasers, it will appear in numbers of from 12 to 13 plates, with the letterpress. The price to subscribers is a Dutch ducat (9s. 6d.), to nonsubscribers it will be a Frederic d'or (17s.) each number: the original price of the whole was 300 florins. The new edition will be executed in the same style of engraving and colouring, and the text will be literally reprinted. Persons desirous of subscribing were invited to send their names and address to Mr. Frederic Guimpel (Nro. 21, Linden Strasse, Berlin); but whether the subscription is still open we are uncertain. The first number will appear towards the end of May.

COUNT RASUMOWSKY'S GARDEN.

Dr. Redowsky has published another catalogue of this garden under the title: *Enumeratio plantarum quæ in horto Exc. Comitæ Aleæii a Rasumowsky in pago Mosquensi Gorinka vigent*, 1804. It contains, in 52 pages, the names of 3238 plants of that garden, which therefore, in the short space of 6 months, has increased by 445 new ones; the first catalogue of 1803 containing no more than 2793 species.

ITALIAN BOTANIC GARDENS.

In several parts of Italy new botanical gardens have lately been laid out. That of Milan is said to be very rich in exotics: its director is Professor Armano.—At Turin the professor of botany is Dr. Balbis; at Bologna Dr. Rodati; at Naples Professor Pettagna.—The botanical garden of Pavia is at present in a very flourishing state: its director is the well known Professor Nocca.—That of Palermo has long since been in good order: its present curator is Dr. Tineo.—The two principal botanical gardens at Genoa are those of Signor Hypolito Durazzo, and of the Marchesa Grimaldi-Durazzo, a lady of great botanical attainments.—At Padua lately died the aged Dr. John Marsigli, F. R. S., a man of great erudition, but only known in the botanical world by his “*Fungi Carrariensis historia*.”

FLORA ITALICA.

Dr. Viviani of Genoa, in his *Elenchus plantarum D. Car. Dinegro, observationibus quoad rariores vel novas species passim interjectis*, has announced a work on the plants of Italy, which will appear under the title of *Floræ Italicæ Fragmenta*, descriptive of scarce and new plants, accompanied by figures.

FLORA LUSITANICA.

The travels of Count Hoffmannsegg and Professor Link through Portugal, are well known in this country by a translation of the journal of this tour, published by the latter. We are now in expectation of a *Flora Lusitana*, which is said to be in great forwardness, and to which the drawings are made by Count Hoffmannsegg, now residing at Brunswic.

FLORA ROSSICA.

Dr. Fuchs, of Herborn, now at St. Petersburg, has for a considerable time past been busily engaged in providing materials for a *Flora Rossica*, of which, we understand, the first volume will soon make its appearance.

FLORA NORICA.

Baron Wulfen, one of the most skilful botanists of Germany, will soon publish a Flora of a part of Carniola, under the title of "*Flora Norica*."

FLORA SIBIRICA.

Dr. Delavigne, author of the "*Flore Germanique*," and translator of Schkuhr's monograph of the genus *Carex*, is actually at St. Petersburg, from whence he is to set out on a botanical journey through the less frequented parts of Siberia.

FLORA OF WAREE AND BENIN.

In the *Decade Philosophique*, No. 10, *An* xii., a Flora of the kingdoms of Oware (Waree) and Benin in Africa is announced by the celebrated De Jussieu, who has added some account of its author, M. Palisot-Beauvois, together
with

with a review of the first number, which had already appeared in France. We find that in 1786 the son of a negro king on the coast of Africa had been brought to France, and that after some months abode he was about to be sent back to his country, called Warce, situate near the line on the borders of the kingdom of Benin; when Mr. Beauvois (already known as a naturalist of considerable expectation), with the sanction of his government, and the privity of the academy, resolved to accompany the prince on his return home at his own charge. He remained in those parts about fifteen months, and was then forced away by the breaking out of an epidemic disorder; but had in the mean time remitted to the care of M. de Jussieu large collections in all the departments of natural history. He afterwards passed five years in St. Domingo, to which country he removed on quitting the coast of Africa. During this period he applied himself to the general investigation of the objects of natural history in that colony; when in a revolutionary convulsion he lost the whole fruit of his West-Indian labours by fire. He afterwards resided some considerable time in North America, still bent on the same pursuits; and we are taught to hope much from what he may on some future day add to the Flora of those regions. He is now returned home, and has commenced the publication of the very promising work we first mentioned: it appears in numbers that contain six plates each; but we are not told the stated periods on which they are to be expected.—The first contains: *POA mucronata*, in habit not unlike *POA eragrostis*, but differs in having a cordately-swoln glume, terminated by a point.—The second is *Acrostichum stemmaria*, a species of Fern already found at Madagascar by Commerson (but not published), and remarkable for its rounded, sinuate, expanded, mutually adpressed radical leaves; from the middle of which rises an upright, wide-spreading leaf, forked at the top, and furnished

furnished in each sinus with a heap of sessile fruits.—The third plant belongs to the mushroom tribe. Its cap, unsupported by a stipe, adheres by one side to trees in the manner of those Agarics that Linnæus has arranged under his genus *Boletus*, where they form a separate subdivision; but almost all these last have a cap furnished underneath with very fine pores closely pressed together. But the author's plant presents on its under side the appearance of a honey-comb; a structure that affords the foundation of a new genus, which Mr. Beauvois has named *Favolus*, referring to it the *Boletus favus* of Bulliard, with several others that he means to publish in their turn. The new species differs from the other by the numerous hairs that cover its upper surface, which has acquired it the name of shaggy or hirsute.—In the fourth place he scrutinizes a vegetable of the natural tribe of *Aroideæ*, differing from *ARUM* in having the upper part of the cylindrical receptacle, which bears the sexual organs, entirely covered with stamens, instead of being naked: from this circumstance he has formed a new genus, to which he gives the name of *Culcasia*, already applied by some older botanists to certain species of *Arum*. While he was communicating this genus to the Institute in a separate paper, M. Ventenat, who happened to be present at the meeting, was then also publishing a plant which had the same conformation, under the name of *Caladium*.—The last plant of this number, which occupies two plates, one showing the flower with its stalk, the other a fruit, is found to possess certain characters peculiar to itself. It is a tree of the order of *Sapotæ*, in which we perceive the structure characteristic of that tribe, such as an inferior monopetalous corolla, bearing the stamens opposite the segments with scales inserted at the interstices; a germen terminated by a single style, that becomes a fruit with several cells, each filled by a single shining seed, the navel of which is very large. In this family, as well as in all others

others with regular monopetalous flowers, the number of stamens is generally equal to that of the divisions of the corolla, or at most double,—consequently definite. In the plant from Waree we find, opposite to each segment of the corolla, a rank of 4—7 stamens, instead of the one usual in the tribe, making in the aggregate from 30 to 40 in each flower.—This conformation is the more striking, as affording an exception to the general character of monopetalous flowers; hence offers a new point of view in the consideration of the modes that accompany the definite and indefinite number of stamens; at the same time giving rise to further explanation in the character of the order of *Sapotæ*. We find also other differences; as for instance, the calyx, instead of being simple, seems composed of scales arranged in several rows; while in the fruit the seed vessel is not fleshy, but coriaceous, and even woody, of a pretty thick substance, replete with a number of small bony irregular tubercles. The entire fruit presents the form of a somewhat depressed sphere, and is remarkable for two considerable umbilicated cavities, formed, the one at the base, precisely where it joins the stalk, the other at the top round the bottom of the style, as well as for numerous cells separated by a pulp. The other genera of this order have their fruit quite fleshy, spherical, or oblong, without any umbilicated cavity, and at most eight or ten cells; so that we see that this vegetable has several claims to constitute a new genus: M. Beauvois calls it *Omphalocarpum*.

M. de Jussieu has himself examined very diligently the whole of the author's novel herbarium, and announces not only that there are plants which will require many changes and additions in the characters of tribes for their due reception, but that there are also others which are likely to constitute entire new orders: hence the work cannot but be highly interesting to botanists, and that in more than one point of view.

FLORA OF THE ANTILLES.

The Flora of Waree and Benin will be followed by a Flora of the Antilles, and another of part of North America, by the same M. Beauvois ; who is likewise employed in preparing for the press a work on Mosses, which is said to contain a variety of interesting observations.

L'HERITIER'S STIRPES NOVÆ.

According to French accounts, the continuation of this work will soon make its appearance.

LABILLARDIERE'S WORK.

We are glad to find that M. Labillardière has at length thought of communicating to the world more of his botanical observations made on his voyage round the world. The first number of a work descriptive of rare plants, collected by himself in different parts of the world, is expected to appear in a short time.

HOST'S GRAMINA AUSTRIACA.

The third volume of this unique publication is expected to come out in a few months : the work will be concluded with a supplementary volume. The price of each volume is fifty florins.

HERBARIUM BRITANNICUM.

Mr. George Donn, of Edinburgh, has published the first fasciculus of dried British plants under the above title. Four fasciculi are to appear in the course of a year. Each is to contain specimens of twenty-five species, attached to so many distinct sheets of fine demy paper, with the names adopted in Dr. Smith's Flora Britannica, and the particular habitats ; in the indicating of which care will be taken to point

point out those places where the plant is to be found in greatest abundance; and also such habitats of the rarer alpine plants as have not hitherto been published. This Herbarium (of which each fasciculus, put in thin boards, is sold at the price of 10s. 6d.) will comprise all the rarer British plants:—of remarkable varieties, or of such as may require minute examination, additional specimens will be given.—It cannot be denied that this first fasciculus is executed with particular care.

DICTIONNAIRE DES SCIENCES NATURELLES.

To judge from the names of the authors concerned in it, the *Dictionnaire des Sciences Naturelles*, actually publishing at Paris, bids fair to rank among the most perfect works of this nature. The botanical part is undertaken by Jussieu of the National Institute: but as the description of all the plants known would be a task much too great for an individual, this naturalist is assisted by Beauvois, Desportes, Duchesne, Jaume, Massé, Mirbel, Petit-Radel, and Poiret; among whom he has divided, by families, the description of the genera and species, reserving for himself all the general articles relative to botany.

BOTANICAL PRIZE QUESTION.

The physical class of the Royal Society of Göttingen has proposed the following *prize question* for the month of November 1805:

Quum physiologi de vasculoso vegetabilium contextu diversa prorsus statuunt, aliis, iisque antiquioribus, illum adserentibus, recentioribus contra in alia omnia euntibus; novis experimentis, ope *microscopii compositi* curate instituendis, elici probarique cupit Societas: utrum omnino a Malpighii, Grewii, du Hamelii, Mustelii, Hedwigii

wigique observationibus ac placitis standum sit, an vegetabilium natura ab animali fabrica prorsus differat, omninoque vel fibrarum fibrillarumque, quæ Medici est sententia, vel cellularum ac tubulorum (*tissu tubulaire*) contextu ac structura contineatur.

As physiologists have been of different and opposite opinions respecting the vascular structure of vegetables, the more antient maintaining, whilst some modern have denied, its existence : the society are desirous that new microscopical experiments should be instituted, in order to decide by them, whether the observations of Malpighi, Grew, Duhamel, Mustel, and Hedwig, be well founded, or whether the structure of vegetables be different in its nature from that of animals, and composed of a peculiar and more simple organization; consisting, according to the opinion of Casimir Medicus, of fibres and fibrils; or, according to that of Mirbel, of cellular and tubular texture (*tissu tubulaire*).

At the same time regard is to be had to the following subordinate queries :—1. How many sorts of vessels can be with certainty assumed from the first period of development of the plant? and, in case they really exist,—2. are those vessels which are called spiral (*vasa spiralia*) themselves hollow? or do they serve to form proper canals by their spiral turns?—and, 3. how do both the fluids and gases move in them?—4. Do (according to Sprengel) the spurious tracheæ (*Treppen-gänge*) originate from the coalition of these spiral fibres? or, on the contrary, (according to Mirbel,) do the latter take their origin from the former? 5. Do the alburnum (*l'aubier*) and lignous fibres originate from the spurious tracheæ; or rather from original and peculiar vessels, or from a vascular texture?

The premium is *fifty ducats*; and the latest period for receiving the observations is before the end of September 1805.

THE LATE MR. CURTIS.

As one advantage arising from the Annals of Botany will be the faithful record of discoveries in the science, it cannot be deemed impertinent to notice an error in a late publication, that tends to deprive a deceased author of his well earned reputation. It is well known that the late Mr. Curtis, whose talent of nice observation was certainly the first trait in his character, plumed himself upon the distinction he discovered between *Poa trivialis* and *Poa pratensis*, in the different shape of the stipula in these two species: his friends will therefore be not a little surprised to find this discovery attributed to Mr. Hudson by Mr. Knapp, in a volume on English grasses, which will soon come under a more particular review. From the very handsome and respectful manner in which this author has, in several places, spoken of Mr. Curtis, we are far from suspecting him of any malevolent intention, and attribute the mistake entirely to an oversight. Mr. Knapp's words, in a note to Plate 54, are—"Most highly as we esteem the botanical erudition of the late Mr. Curtis, to whom this excellent distinction is usually attributed; yet, in justice to the author of the Flora Anglica, we cannot help mentioning, that the merit of pointing out the distinguishing character between these species is undoubtedly due to Mr. Hudson: of the *Poa trivialis* he says, 'stipula acuminata;' of the *Poa pratensis* he observes, 'stipula obtusa:' yet we are convinced that Mr. Curtis did not arrogantly assume this merit to himself, but overlooked the distinctions marked by Hudson: a solitary instance, perhaps, of marked inattention in that excellent botanist." Now the truth is, that the second edition of Mr. Hudson's Flora Anglica was published long after Mr. Curtis had made his discovery known to the public; and that in the first edition there is not one word of this distinguishing character to be found. Mr. Knapp was, undoubtedly,

undoubtedly, led into this mistake from the circumstance of Mr. Hudson's adopting the character without acknowledging the source from whence he derived it : and as he has not quoted the *Flora Londinensis* in any part of his work, any one inattentive to dates might readily enough conclude it had not then been published ; though, in fact, the first volume, containing 218 plates, was completed a year before.

SUSPENDED. VEGETATION.

That it is practicable to suspend vegetation in several trees which have *gemmæ* furnished with scales, appears from experiments made at Moscow by the late Mr. Demidow. This gentleman has preserved, in an ice-cellar, apple and pear trees that were sent to him from France during winter, and kept them in that place till the spring of the following year. Though vegetation was thus suspended during nineteen months, (i. e. thirteen months longer than would have been the case had the trees not changed their place,) yet they have vegetated and produced flowers, together with some fruit. It would have been interesting to continue the observations on the vegetation of these trees for the ensuing years ; but the death of Mr. Demidow has interrupted this curious and useful experiment.

VEGETATION IN NORWAY.

We learn from the *Collegial Gazette* of Copenhagen, that Professor Esmarck, of Kongsberg, has made very interesting observations in his tour through Norway, undertaken to determine the snow line, and *line of vegetation* of that country. Of all the mountains he ascended, the Schnee-hütten on Dovrefield is the highest : it is continually covered with snow ; its altitude above the level of the sea being more than 8000 Rheinland feet. At the height of 1000 feet several kinds of fruit-trees thrive, and produce
abundant

abundant crops. The silver fir can bear a higher degree of cold than the spruce fir; the latter thriving only at the height of 2000 feet, while the former is still found at the height of 3000 feet. The birch grows vigorously to the height of 3000 feet; at a higher altitude only *Betula nana* is found, with some species of *Salix* and the common Juniper; which however do not thrive at a greater height than 3200 feet above the level of the sea. Barley and oats grow, indeed, at the altitude of from 1500 to 1800 feet, but only in valleys. At the height of from 1200 to 1300 feet, the nightly frosts prove often very injurious to the young crop.

VEGETATION ON MONT PERDU.

M. Raymond, on a late ascension on *Mont Perdu*, met with no other phænogamous plants on its summit than *Aretia alpina* Linn. and *Saxifraga retusa* of Gouan; lower down he found *Cerastium alpinum*, *Saxifraga grænlantica*, and *Ranunculus parnassifolius*. He is of opinion that it is not so much the altitude of the Pic that here makes the number of plants so very small, but rather the want of soil.

SEEDS FALLEN IN SPAIN.

Though this phænomenon savours rather of the marvellous, it appears so well authenticated, that we have no scruple in mentioning it in this place. The joint post-masters-general of Madrid have communicated to the ministers of state a letter from the post-master at Leon, in which he gives the following account of it:—Three leagues from Leon, on an uncultivated spot, near the road between the villages Matucca and Flecha, a storm arose on the 27th of July, 1803, soon after mid-day, in which, together with hail and rain, there fell nearly twelve fanegas (about 20 bushels) of a seed entirely unknown in that neighbourhood. Some of them being planted, they germinated,

minated, and came up after a few days. They were smooth, of a grayish hue, of the shape of a small French bean, but shorter, and compressed; their base was furnished with a navel rather prominent, with a longitudinal groove; they had no albumen, and the radicle was bent over the cotyledons. Boiled and dressed, they were found very palatable.

A quantity of these seeds being sent to Madrid, Professor Cavanilles, director of the royal gardens of that city, planted them the 8th of August. They appeared above ground the 30th of the same month, displaying two thick orbicular cotyledons notched at the base. The 29th they had already produced some alternate leaves; the lowermost of them with ternate leaflets, the others digitated with 5—7 ovate, entire and hairy leaflets.

The nature of the seeds sufficiently indicated their belonging to a plant of the natural order of Papilionaceæ; and from a letter of Professor Cavanilles to A. B. Lambert, Esq. we learn that they are a species of *Lupinus*; as also that the young plants were in a vigorous state, but without having produced flowers.

The manner in which naturalists account for this singular phenomenon, is, that these seeds have been conveyed by a whirlwind from a distant place. A similar case is related of a shower of wheat that fell some time ago on the coasts of Andalusia; and which, as it is said, was afterwards found to be carried thither from the threshing places in a field in the neighbourhood of Tangir.

ANNALS OF BOTANY.



XII. *Some Account of the Sago Palm (Metroxylon Sago), from the Manuscripts of the late Dr. KONIG, and from a Specimen of the Inflorescence, in the Possession of the Right Hon. Sir JOSEPH BANKS, Bart.*

WHETHER we consider their exquisite beauty; singular structure, mode of growth and œconomy, or the vast variety of uses to which they are applied,—the *Palms* are in all these respects one of the most interesting of the vegetable tribes. Their stately appearance (which suggested to Linæus the fanciful title of *Principes*, while he denominated the humble grasses *Plebei*) is, indeed, but a subordinate consideration to him who contemplates a structure, so simple and striking, and yet so distinct from that of all other tribes of the monocotyledonous class: he sees the young plant tower from the earth often to an immense height, without increasing in circumference; he reckons its age by the number of outward circular scars (the vestiges of a periodically falling foliage); while a transverse section of its stem offers to him no concentric circles, no texture of various kinds of vessels, no silver grain, but merely a

mass of simple longitudinal fibres, the solidity of which decreases from the circumference to the centre, where each fibre is surrounded by medullary substance.

Not less wonderful is their extensive and general utility, which in some is equally important to their cultivators as that of the rein-deer to the Laplander. The foliage of most of them, while yet in the bud, is what we find so often celebrated in the works of our navigators under the appellation of the palm cabbage; when old it is converted into coverings, mats, baskets, &c. The juice, which from some is obtained in an incredible quantity, is a delicious beverage, both while fresh and when fermented; and Shaw informs us that among the Arabs the rich and fashionable people are accustomed to entertain their guests at great festivals with what they call palm honey, to procure which they cut off the crown of a palm of the most vigorous kind (generally a date tree), and scoop the top of the trunk into the shape of a bason: nature endeavours, though in vain, to heal the fatal wound by a sanative ascending sap, which lodges in the cavity, and after some weeks acquires the solidity and taste of real honey. While the fruits of some palms are the food of whole nations, the stems of others contain a mealy pith, equal in nutritive quality to any farinaceous substance we are acquainted with. All possess a medullary substance, which in cases of emergency is more or less a substitute for other food; but in some it is peculiarly abundant, as in *Phoenix farinifera*, *Caryota urens*, *Cycas revoluta* *Thunb.*, *Borassus Gomutus* *Lour.*, *Zamia Cycas*, and above all the Sago palm, which is the great staff of life in all the Moluccas, Philippine Islands, in Java, Borneo, Amboyna, Ceram, and other eastern islands.

By Linnæus this plant was considered as the same with *Cycas circinalis*, but it has since been found to be distinct, constituting a new genus which Rottböll has denominated

METROXYLON. As there is no description extant* which can convey instruction to the botanist*, I have availed myself of the permission I have obtained to arrange the different fragments of description and observations on this vegetable in the late Dr. Koenig's manuscripts in the possession of the Right Hon. Sir Joseph Banks, and to make a drawing from a specimen of part of a raceme sent by Dr. Koenig. This specimen, though injured by time and the wreck of the ship that brought it over, still exhibited, on its well preserved aments, some male flowers which, on account of the strength of their texture, were very fit for examination; but no hermaphrodite ones were to be found.

The Sago palm partakes much of the habit of the Cocoa, but never attains the height of the loftiest of these: when in perfection, it measures from 24 to 50 feet; its circumference is, however, much more considerable than that of the Cocoa, and it sometimes exceeds two feet in diameter. The bark, or rather the surface of the stem, is of a whiter colour than that of the Cocoa, and is marked with small linear grooves, and cavities of the size of a pea.

The crown consists of a collection of pinnated leaves that very much resemble those of the Cocoa, but are considerably longer. The common petioles are widened at the base, forming as it were so many sheaths that conjointly inclose the upper part of the stem; they are smooth, convex above and concave at the back: along the convex side runs, from

* Rumpf gives an account of several varieties (or species?) of Sago; but that which yields the best and finest pith, and which is the subject of the above description, he mentions only in a superficial manner, as *var. iv.* (vol. i. p. 76).—A short description, with figure of the inflorescence, from a dried specimen sent by G. Koenig, is given by Rottboell in the *Acta Hafniensia*, but which does not supersede a fuller description of this interesting vegetable: I have however retained the name of *Metroxylon*, which that botanist has given it.

the base to the top, a shining, rust-coloured streak of the width of a finger.

The leaflets are opposite, entire, linear-oblong with a slight curvature, minutely striated, smooth, of a more delicate texture than those of the Cocoa palm, and furnished with a strong midrib, terminating in a thin triangular point above a span long, and beset with short, very pointed, whitish prickles that are continued down the midrib on the lower surface of the leaf, where they are intermixed with rust-coloured distant paleæ, as in the ferns. Some of these prickles are also to be observed on the upper surface of the midrib.

The flower-bearing peduncle or *spadix* shoots up from the centre of the crown; it is divided at its base into five or six racemes of different length (that from which the diminished figure was taken is above six feet long), which at first stand perfectly upright, but as they advance towards maturity continue to expand themselves till the time of the fruit's beginning to ripen, when they are placed almost horizontally as the leaves are, which they nearly equal in length. At the base they are of the thickness of the arm, diminishing gradually upwards, and are divided into from 14 to 18 joints, each invested with a sheath. These *sheaths*, with which the rachis is entirely covered, are alternate, coriaceous, of a strong texture, the under part cylindrical embracing the stem, the upper dehiscent and lengthened out towards the top: those near the base of the racemes are the largest (from six inches to a foot long), the upper ones gradually diminishing in size. From these sheaths issue the lateral branches, which are rather compressed, from one to two feet long, and one inch thick at their base, generally straight, sometimes incurved, of a woody texture; they consist of from seven to ten joints, each furnished alternately with a sheath from two to three inches long, and of the

the same construction as those of the general peduncle.—At each of the joints are placed the *aments*, on alternate flattened woody pedicles hid within the sheath; they are of a cylindrical form, like those of *Typha*, from four to nine inches in length, in diameter rather more than half an inch, and consist of a cylindrical rachis of the thickness of a goose quill, to which are fixed (almost in a spiral direction) a number of horizontal, membranous, stiff, striated *scales* of a reddish colour, separated from each other by a beautiful, silky, rust-coloured *down*.—Imbedded in this down, and each supported by a scale, are the small *flowers* that cover the ament, being fixed to the small tubercles of the rachis. These are hermaphrodite, but very liable to abortion.

The *calyx* is inferior, monophyllous, with three upright obtuse, almost heart-shaped laciniae, shorter than the corolla, rather concave, sharp at the edges and thick at the base.

Corolla monopetalous, striated towards the base, easily separable into three ovate-lanceolate, concave, smooth, rust-coloured segments, less coriaceous than those of the calyx, with which they alternate.

Stamens six, awl-shaped above, dilated below and mostly grown together in pairs: these are inserted at the base of the laciniae of the corolla, which they equal in length.

Anthers of a yellowish colour, versatile, oblong-heart-shaped, triangular, with a blunt point and two-celled.

Germen superior, ovate, covered all over with small scales densely imbricated, rhomboidal, horny, scarious, rather convex on their upper surface, smooth, glossy, of a yellowish colour, their loose part directed downwards.—

Style erect, pyramidal, triangular, three-furrowed, flesh-coloured, smooth, rather shining, the length of the stamens, shorter than the germen, easily divisible into three

parts, in which state they are sometimes found, and then the three detached parts are bent backwards.—*Stigma* simple, with three points.

The fruit of the Sago is what Gærtner calls a corticated berry, of a yellowish-brown colour, and, in the variety here described, of the size of a golden pippin, with a large seed nidulate in a fleshy or spongy substance; the rind is composed of scales that have their open sides directed downwards as in the fruit of Rotang.

These seeds are generally found rotten and destroyed by worms; even the good ones, that are sometimes eaten by the poor people, will seldom shoot up when committed to the ground; and Dr. Koenig was informed at Malacca that they never germinated there. The only mode of propagating the Sago palm is by young shoots, which spring plentifully from the ground when the stem is cut down. These will seldom thrive, however, when transplanted; according to Mr. de Vent (who was a great proprietor of Sago plantations at Malacca in Dr. Koenig's time) not more than one out of twenty or thirty will thrive.

This vegetable succeeds best in a low, moist, and fat soil, in which it may be brought to produce flowers in ten years, if proper care be taken of it, otherwise it requires twenty years or more. It never flowers more than once, when it perishes immediately after the ripening of the fruit.

The period in which the greatest quantity of Sago is found in the tree, is when the racemes of the flower begin to expand; before this the mealy pith is imperfect, and in small quantity, and after it the Sago becomes hard and woody. When the racemes are very large, and exceed the crown of leaves in length, a great produce is expected.

A good sized tree, as Mr. de Vent informed Dr. Koenig, yields from four to five and a half picols of Sago. Of those that were cultivated in the gardens, the general account

count was that they yielded from two to three picols each ; but that at Jahaor the trees became much higher and produced much more.

Though the earliest travellers to the East, such as Marco Polo in the thirteenth century, mention Sago and the bread made of it, yet the form in which we see this material in Europe, that of pearl-coloured, hard, scentless grains, almost of the shape of coriander seeds, is not mentioned even so late as the period in which Rumpf wrote his *Herbarium Amboinense*. Hence it is not improbable (and this is also Professor Beckmann's opinion) that the granulation of the Sago was not invented or made use of till the British and Dutch East India companies thought of extending the sale of this commodity to Europe, though as a powder it had long before been an article of trade to them in India.

It is more than probable too that a great quantity of the granulated Sago which comes to Europe, is not the produce of the *Metroxylon* ; at least that which is known by the name of Borneo Sago appears to be made from the pith of the *Saguer* or *Saguwehr* (*Areng saccharifera* of Labillardière) : as for the Sago powder sold in the shops, it is, according to Dr. Wright*, merely the starch of potatoes.

I am not acquainted with any satisfactory account of the mode of granulating the pith of the Sago ; though there can be no doubt that it is done through a sort of sieve or cullender, in the same manner as the grains of gun-powder are formed, yet the preparatory process which the mealy substance undergoes, is differently stated. According to some it is washed and beaten into a stiff paste ; others state that the powder is sifted into boiling water, and kept con-

* London Medical Journal, vol. 8, p. 293.

tinually

tinually stirring till the whole is converted into a semitransparent jelly or paste, which is made use of for forming the grains that are afterwards dried in the sun.

C. K.

Explanation of Table 4.

* A raceme of the spadix of the Sago palm.

Fig. 1. An ament with flowers, nat. size.

2. A horizontal section of the same to show the insertion of the scales.

3. A flower half opened.

4. Situation of the stamens before the opening of the flower.

5. Male flower expanded.

6. Female flower. *a.* Horizontal section of the germen.
b. A scale of the germen magnified.

XIII. *Account of a new Species of Plantain, called Abacà, from the Spanish* of Don LUIS NEE.*

ABACA† is a name which the natives of the Philippine islands apply both to the vegetable fibres of which they make their cordage, and the plant that yields them. This is a species of plantain tree, the same which is called by Rumpf ‡ *Musa sylvestris*, and in the Malay language

* Anales de Ciencias Naturales, vol. iv. p. 123.

† The natives distinguish several varieties of the Abacà:

1. Abacà brava (the wild A.) called *Agotai* by the Bicoles.

2. Mountain-Abacà, the fibres of which only serve for making ropes that are called *Agotag* and *Amoquid* in the Bicol language.

3. The *Sagig* of the Bisayas.

4. The *Laquis* of the Bisayas, by whom the fibres of the origin are called *Lanót*.

‡ Herbar. Amboin. vol. v. p. 139.

Pissang Utan. It is found wild on the Philippine and **Mendanao Isles**, and is also most carefully cultivated, on account of the singular advantages which the inhabitants have learned to derive from it. Extensive plantations of it are to be met with on the island of Luzon, in the provinces of Albay, Laguna, and Camarines, but particularly in the vicinity of mount Mayong*, the base of which is about fifteen leagues in circumference. The soil of this extensive tract, and that in the neighbourhood of another considerable mountain, called Isaróg, is very well adapted to the cultivation of the *Abacà*, which thrives only in moist, shady, and fertile ground. In such situations thickets are formed by their trunks and young suckers, which last are sheltered from the intense heat of the sun by the beautiful and widespreading foliage with which the full grown trees are crowned. The stems issue from a sort of tuber furnished with fibres, and grow in less than eighteen months to the height of seven feet, their thickness being that of a man's thigh. They contain a column of white and delicate pith, very like a white wax, of the thickness of a man's arm, and covered with several coats of fibrous membranes, the remains of former leaves. The leaves forming the crown of the tree are from ten to twelve in number, of which the outer ones spread horizontally, while those in the centre are divergently erect. They are five feet or more in length, one and a half broad, and supported by a stalk about a foot in length, which is prolonged on the under surface of the leaves, into a thick longitudinal rib, with which many small ramifications communicate. When this herbaceous plant (for such, notwithstanding its size, it really is) has attained its greatest state of perfection, which it acquires in less than

* The bishop of New Càceres, Don Domingo Collantes, has favoured me with the description of the volcano in mount Mayong, in the province of Albay, as also with that of mount Isarog, in the province of Camarines.

two years; a thick peduncle issues from the centre of the leaves, covered with partial, concave, ovate, acute spathes, which are developed in proportion to the growth of the peduncle. When they have acquired the length of three or four feet, the flowers appear, from nine to fourteen in each spathe, and are followed by green hard fruit, one and a half or two inches long, disagreeable to the taste, and applied to no use whatever.

When the fruit is ripe, the stem perishes as in other herbaceous plants, but a progeny survives in the suckers, which by this time have made their appearance. As the old trunks are not proper for use, the natives usually cut them down when a year and a half old, at which age this may be done with advantage. The stems being cut off near the roots, and at the upper extremity a little below the leaves, are slit open longitudinally in order to separate the medullary substance from the fibrous strata, of which the outer are harder and stronger, forming the *bandalà* used in the fabrication of cordage; the inner consist of finer fibres, and yield the *lupís*, used for weaving the *nipís*, and other more delicate fabrics, and the intermediate layers are converted into what is called *tupox*, of which the *guinarras* are made.

All these layers of fibres are saturated with a thickish fluid; to clear them from which they are cut into shreds two or three inches wide, and dressed like flax in a sort of heckle or long piece of wood, furnished with three narrow knives, which being held in the right hand, the shreds are managed with the left, and thus reduced into fibres, and are by this process cleared from the fluid with which they were impregnated. In this state they are dried in the sun, picked and applied to different uses according to their different qualities. Those intended for cordage, &c. undergo no further process; but the others are rendered more soft and pliable by beating them with a wooden mallet; they are

are then fastened to each other by means of almost invisible knots, wound into balls, and committed to the loom.

The guinarras are four yards (*varas*) long, half a yard wide, and differ in fineness and value. The coarsest sell for the eighth part of a Spanish dollar; but others are so superior in quality as to bring five dollars: a shirt or shift made of this fine sort may be inclosed in the hollow of the hand.

The stuffs when woven are soaked in warm water for twenty-four hours, after which they are washed in cold clear water, then put, for the same space of time, in rice-water, and lastly washed as at first, by which means they acquire lustre, softness, and a white colour; which last, however, the natives do not understand how to preserve; for by dint of time and frequent washing the cloth becomes of a reddish hue.

The cultivators of the *Abacà* bind up the fibres as the Spanish peasants do hemp. Each of the bundles generally weighs one *arroba*: if they are *bandalá* they sell at the rate of the fourth part of a dollar a piece; the bunches of *tupóz* at three eighths, and those of *lupts* at five eighths each. These bundles are brought to market and sold to the women who manufacture them. I had an opportunity of seeing the looms of Nabúa, where I was told that a woman cannot weave more than one piece of stuff in seven days. Those of the coarsest sort, called *tinagsad*, sell at the rate of one fifth of a dollar the piece; they are four yards (*varas*) long, and made use of by the women as garments during the sowing-season. Others of rather superior quality, called *hondoy*, are likewise used for garments, and are sold for the fourth part of a dollar when plain; the dyed ones are somewhat dearer. The sort called *mabao* requiring more labour to be worked in stripes, is still more expensive. Two other sorts of superior quality are

are *linacól* and *piring-pítang*, the latter of which sells for a dollar. Other stuffs of fine colours and exquisite quality, called *cambayes*, I saw manufactured at New Cáceres, that are made use of by very rich ladies for shifts ; in these cotton and silk are mixed in certain proportions with the Abacà.

They manufacture several patterns of the Abacà different in design and colour, according to the different uses for which they are destined, such as for dresses, shirts, curtains, table cloths, sofas, &c. The abundance is so considerable, that, as I am credibly informed, the villages Cagsavá, Camalig, Guinapatan, and Ligáo furnish yearly 1500 arrobas each. In the district of Camarines they manufacture 1900 arrobas of cordage annually, and nearly the like quantity in the district of Albay, all which the king receives for one dollar and a half the arroba. With these the natives pay their tribute, parish due, &c. ; they clothe themselves, and purchase necessaries of life.

In the manufactories of New Cáceres, an astonishing quantity of cordage is produced, which they used to convey down the river as far as Sangai, and from thence by land to the storehouse at Pasacao. The latter stage, which is of three leagues, was formerly very tedious ; but now, as the magistrate Don Manuel Lecarós has caused a very fine and convenient road to be made for carriages, it is not attended with any trouble.

It is a matter of surprise, that neither Linnæus nor subsequent botanists, have mentioned a plant which is so very well known and used in the Philippine Islands, though Rumpf, in the "*Herbarium Amboinense*," gives some account of it : he mentions its fruit as being very small, hard, and useless, and says that at Mindanao they are skilled in manufacturing ropes of the outer, and cloths of the inner fibres of its trunk. This author gives to our tree the name of *silvestris*, from a supposition that it is neither cultivated

at Mindanao or Luzon; but as the fact is quite otherwise, at least at the present time, I thought it proper to alter the name, and to call this species of plantain *Musa textilis*, especially as it is the only one of which the fibres are converted into such exquisite articles of manufacture.

Though thousands of the true *Abacà* have been examined by me, yet I never succeeded in discovering it in flower. I have been more successful, however, in this respect, with the other species and varieties of *Musa*, which are distinguishable from each other by the extension of their leaves, by the different colour of the spathes, and the size and taste of the fruit. There are at least twenty-seven different sorts on the isle of Luzon only, which I have examined; but as I do not here intend to determine how many of them may be real species, I shall be contented with communicating what my long continued observations have taught me with respect to the flower in general.

European botanists, after having seen one or two *Musas* in flower in hot-houses, maintain that they are furnished with six stamens, but not all perfect. This opinion of Linnæus has been adopted by Trew and others, except Scopoli, who tells us that he has always found the flowers of plantain trees complete, with five stamens, and never discovered the least rudiment of the sixth;—an observation which I can pronounce to be completely correct. This circumstance removes *Musa* from the place assigned to the genus by Linnæus in his system, and brings it nearer to *Heliconia*. As the result of my observations on the different species, not only in the Philippines, but also in the Friendly Islands, in Peru, in Arica, and New Spain; I propose the following reformed character of the genus:

Cal. Spatha partialis, ovato-oblonga, concava, multiflora.

Cor. dipetala: petalum superius magnum angustum truncatum,

eatum, 5-fidum laciniis brevibus : inferius dimidio brevius membranaceum subinvolutum, apice emarginato-mucronatum.

Stam. Filamenta 5 petalo superiore breviora eoque inclusa receptaculo inserta : Antheræ didymæ lineares filamentorum parti superiori adnatæ.

Pist. Germen oblongum obsolete 3—4-gonum. Stylus erectus canaliculatus stamina æquans. Stigmata 3, planâ; crassa, leviter, inter se cohærentia.

Per. Bacca carnosâ, cucumiformis, parum curvata, obtusè trigona. Semina numerosa, subglobosa.

Obs. The spadix is solitary, and the spathes are disposed on it alternately. Of these each contains from nine to fourteen flowers, which open and are fecundated successively. While the fruits are already arrived at maturity at the base of the spadix, this part still continues to grow, and the flowers of perhaps thirty spathes towards the top remain to be opened. The latter, however, though their organs are very perfect, will never bring forth any fruit, which may be occasioned by the great quantity of fruit situate at the lower part consuming all the sap, part of which ought to be conveyed to the flowers at the extremity, or that these are thus deprived of the energy necessary to refine the great quantity of viscous liquor contained in the spathes, and thus become sickly and decay.

XIV. *A Monograph of the Genus Tilia, by Professor*
VENTENAT*.

WHEN Linnæus published the last edition of his "Species Plantarum," he knew but two species of *Tilia*, which he called *Tilia europæa* and *americana*: these names are, however, become rather improper, as we are now acquainted with several species of this genus, both of Europe and America. Miller described the lime-trees of America in his Dictionary, where he retained the name of *americana* to that so called by Linnæus, giving to the second the name of *caroliniana*, because it had been introduced from Carolina into England by Catesby. But this latter denomination should be likewise suppressed, as Michaux and other botanists have discovered in that country a species different from that of Catesby, whence *Tilia caroliniana* is called *pubescens* in the "Hortus Kewensis." To see the utility and even necessity of changing these names, I need only quote Walter's definition of the lime-tree he found in Carolina; namely, *Tilia americana floribus nectario instructis, stipulis floriferis*. This being equally applicable to all the species found in America, it would be a matter of the greatest difficulty to find out the species to which Walter alluded, but for the assistance of the dry specimens of the plant brought from Carolina by other naturalists.

These circumstances will exculpate me, if, as the writer of a monograph, I should make some alterations with regard to the names of the old species of this genus, which I characterize as follows:

* This Dissertation was first published in Spanish in the *Anales de Ciencias Naturales*, afterwards rather enlarged in the fourth volume of the *Memoirs* of the National Institute, to which learned body it had been read before it made its appearance in the above Spanish work.

GENERIC CHARACTER.

Calyx free*, falling, of one piece, divided into five segments.

Corolla, petals five, alternate with the segments of the calyx, naked in the European species†, each with a scale at the base in the American species.

Stamens many, hypogynous: filaments free‡: *anthers* round.

Ovary free, globular, hirsute, 5 celled, each with two ovula in its inner corner: *style* cylindric: *stigma* capitate with five teeth.

Pericarp: nut§ globular, coriaceous or ligneous without valves, one-celled, with one or two seeds when ripe (the other two or three seeds are often abortive, and four of the cells disappear).

Embryo surrounded by a fleshy perisperma; *cotyledons* sinuate or toothed.

The bark of all the species of *Tilia* is very flexible; the wood is white and of no great specific gravity. The seminal leaves are divided into five unequal lobes||, those of the stem and branches rolled inward before they open, alternate, simple, heart-shaped or obliquely truncated at the base;

* Free (*liber*) is a word which I substitute to *inferus*. Vid. my *Tableau du Règne Végétal*, p. 64.

† I never succeeded in finding the filiform nectaries mentioned by Mr. Rudolph.

‡ Mr. Schkuhr, in his Botanical Manual, p. 71, 72, pl. 141, describes the stamens of *Tilia femina folio majore* C. B. as polyadelphous. I have examined them with great care, and they always appeared to me distinct and entirely free.

§ I thought it necessary to use the term *nux* in preference to *capsula*, as the fruit of *Tilia* is without valves—" *Nux a capsulis distat plenario valvularum defectu.*" Gærtn. I. p. xci.

|| John Bauhin was the first who made this observation. The seminal leaves of the American limetrees are likewise divided into five unequal lobes.

stipules caducous. Flowers complete and disposed in corymbi at the extremity of a lateral peduncle, that is free at its upper part, and adhering at the under to the longitudinal nerve of a membranous lanceolate bracte.

The difference mentioned in the generic character respecting the petals of the European and American lime-trees, appears naturally to separate them into two sections.

§ I.

European lime-trees: naked petals.

1. *TILIA microphylla* foliis cordato-subrotundis, acumina-
tis, argute serratis; nuce subglobosa, tenuissima, vix
costulata, fragili.

T. sylvestris. Trag. 4.

T. femina, folio minori. *C. B. Pin.*—*Vaill. Bot. Par.*—
Dalib. Fl. Par.

T. folio minore *J. B. vol. 1. part ii. p. 137.*—*Ray Hist. Pl.*
p. 1695.—*Garid. Hist. Pl. prov. p. 464.*

T. Betulæ nostratis folio *Pluk. Mant. 181.*

T. Ulmifolia *Scop. Fl. Carn. ed. 2. no. 642.*

T. europæa *Linn. Sp. Pl. var. 3. p. 733.*—*Fl. Dan. t. 553.*

Tilleul à petites feuilles, ou tilleul des bois, ou tillau. *Duk.*
Arb. no. 1. pl. 95.

Var. T. bohémica foliis minoribus glabris, fructu oblongo
utrinque acuminato, minime costulato *Till. Hort. Pis.*
tab. 49. f. 3.—*Vaill. Herb.*

T. folio glabro, duriori, minori *Hall. enum. p. 358. no. 2.*

As Linnæus* has given a complete description of *Tilia europæa*, I shall only enumerate the characters that distinguish my species. I have given to this the name of *microphylla*, as its leaves are smaller than those of the other known species. Its trunk is covered with a thick bark, the epidermis of which is smooth at the upper, and furrowed with fissures at the lower part. It will rise to the height of

* *Philosophia botanica*, ed. Willd., p. 261.

forty-eight feet, and sometimes acquire nine feet in circumference. Its leaves are one inch to one and a half long, and the same in breadth, of a firm and solid texture, glossy above, and almost constantly pubescent below: at the point from which issue the lateral ribs stands a bundle of rust-coloured hairs. The fruit is a roundish nut, sometimes acuminate at its extremities, easily cracked, pubescent, and with a single seed.

2. *Tilia platyphyllos* foliis cordato-subrotundis, acuminatis, inæqualiter serratis; nuce turbinata, costis prominentibus insignita, lignosa, crassa.

T. femina, folio majore C. B. Pin.—Ger. Fl. Galloprov.—Linn. Fl. Suec. ed. 2. p. 183.—Quer Fl. de España, vol. vi.

T. vulgaris platyphyllos J. B. vol. 1. tab. 2. p. 133.—Raj. Synops. p. 473. et Hist. Pl. p. 1694.—Magn. Bot. p. 254.—Scop. Fl. Carn. ed. 2. no. 641.

T. silesiaca, folio maximo varie et profunde serrato, fructu subrotundo, anguloso et lanuginoso. Till. Hort. Pis. p. 165.

T. cordata, foliis cordatis acuminatis, inæqualiter serratis, fructibus 5-locularibus tomentosis. Mill. Diet.

T. foliis cordato-lanceolatis, spongiolis ad nervorum folii angulos sessilibus. Hall. Hist. no. 1030.

T. europæa L. var. *a.* Spec. Pl. p. 783.—Blackw. tab. 469.—Gouan Fl. Monsp.—Vill. Plant. du Dauph. IV, p. 798.—Gærtn. Sem. II. p. 150. t. 113.

T. platyphyllos Scop. Fl. Carn. no. 641.

Tilleul à grandes feuilles, ou Tilleul de Hollande. Duham. Arb. no. 2.

Var. *a.* *T. corallina.* Hort. Kew.

T. foliis molliter hirsutis, viminibus rubris, fructu tetragono. Raj. Syn. p. 473.

T. sylvatica

T. sylvatica nostras, foliis amplis hirsutis pubescentibus, fructu tetragono, pentagono aut hexagono. *Pluk. Alm.* 368.

T. europæa foliis acuminatis, serratis, subhirsutis; fructibus quadrangularibus, subpilosis. *Mill. Dict.*

T. foliis amplioribus, mollibus subhirsutis. Hall. Enum. p. 357. no. 1.—*Bœhm. Lips.* no. 397.

Tilleul dont les feuilles sont légèrement velues, les jeunes branches teintes de rouge et le fruit triangulaire. *Duham. Arb.* no. 4.

Var. β. T. variegata, folio majore variegato: tilleul à grandes feuilles panachées. *Duham. Arb.* no. 3.

Though this species bears great resemblance to *Tilia microphylla*, yet its characters prove that it should not be considered as a mere variety of this: it does not attain so great a height, and its leaves are constantly much larger, whiter, and more pubescent; it also displays its flowers a month sooner, and its fruit differs from that of the other, not only by its shape and projecting ribs, but also by its substance, which is very thick and hard. Some ancient botanists, such as the two Bauhins, Ray, and Plukenet, and among the moderns, Miller, Haller, Duhamel, Scopoli, Schkuhr, Ehrhart, &c.* are of opinion that both these species are really distinct. Linnæus, however, has united them into one under the name of *europæa*, the reason for doing which he has given in his *Hortus Cliffortianus*, p. 204. where he says, *fructus globosus, si modo unico prægnans est semine, ut communiter fit; si vero omnia quinque semina ad maturitatem perveniunt, angulatus fit fructus*. In order to appreciate the merit of this observation, I have opened a

* Professor Vahl, the celebrated Danish botanist, has informed me that Ehrhart had separated, as distinct species, the two varieties of *T. europæa* L., in a work entitled *Beiträge*, which I have not met with in any of the national libraries at Paris.

great number of the fruits of both species, when I constantly found that none of them contained more than two seeds, and the greatest part of them only a single seed.

Besides, we find that in some parts of Europe there is one of the two species of lime-trees, with the exclusion of the other: in Bohemia, for instance, in Denmark, &c. only *TILIA microphylla* is met with; while *platyphyllos* grows exclusively in Sweden, Spain, and other parts of Europe.

§ II.

American lime-trees: petals with a scale at the base.

3. *TILIA glabra* foliis profunde cordatis, argute serratis, glabris; petalis apice truncatis, crenatis; nuce ovata subcostata.

*T. foliis majoribus mucronatis. Clayt. Fl. Virg. p. 58.—
Duham. Arb. no. 5.*

*T. amplissimis glabris foliis, nostrati similis. Pluk. Mant.
181.*

*T. americana, floribus nectario instructis. Linn. Sp. Pl.
p. 733.*

T. americana, foliis cordatis, acuminatis, serratis, subtus pilosis; floribus nectario instructis. Mill. Dict.

*T. americana, floribus nectario instructis, foliis profunde cordatis, argute serratis, glabris. Hort. Kew. p. 228.
Habitat in Canada et in altis montibus Carolinae.*

This species is the first of those discovered in America. Its stem, according to Michaux, rises to the height of nearly 80 feet. The bark of its stem and branches is of a dark brown colour: its leaves, that issue from glossy gemmæ of a dark purple, are heart-shaped, serrated, very pointed, rather villous when young; but afterwards completely smooth, larger than those of the species generally cultivated in the gardens.—Flowers in corymbs and supported by a common peduncle of nearly double the length of the petioles:—petals

als truncated and toothed towards the top.—Fruit an oval, ash-coloured, pubescent nut, with obsolete corners.

4. *TILIA pubescens* foliis basi truncatis, obliquis, denticulato-serratis, subtus pubescentibus; petalis emarginatis; nuce globosa, lævi.

T. caroliniana foliis cordatis, obliquis, glabris, subserratis cum acumine; floribus nectario instructis. *Mill. Dict.*

T. americana floribus nectario instructis; stipulis floriferis. *Walt. Fl. Car.* 153.

T. pubescens, floribus nectario instructis; foliis basi truncatis, obliquis denticulato-serratis, subtus pubescentibus. *Hort. Kew.* p. 229.

Hab. in Carolina.

Var. T. leptophylla, foliis basi oblique truncatis, laxe serratis, tenuissimis, subpapyraceis, subtus pubescentibus.

Hab. in Luisiana.

This species, common in Carolina, and especially in the neighbourhood of Charlestown, is distinguishable from the preceding one by the following characters: its stem, according to M. Michaux, does not attain the same height; and its bark is thin and furrowed; the direction of its branches approaches more to horizontal; the gemmæ are tomentose and of an ash colour: the leaves, obliquely truncated at the base, are rather tomentose whilst young; but as they grow older lose part of their down, leaving only some hairs in the form of stars, nearly in the same manner as we observe them in almost all the species of *Alyssum*: the leaves besides are smaller, and the teeth of their margin rather more distant from each other. The petals are straighter, and terminate in a point. The divisions of the stigma are deeper and more spreading. The fruit is a globular, smooth, tomentose nut.

The above *T. leptophylla* from Louisiana is cultivated in the gardens of Jansen and Lemonnier, where it is considered as a distinct species, and called *multiflora*; but

I think it can only be considered as a variety of *T. pubescens*, from which it differs merely in its leaves being very thin and their teeth more remote.

5. *TILLA rotundifolia* foliis cordato-subrotundis, subsinuatis, dentatis, verticalibus, subtus albo-tomentosis, nuce ovata.

T. alba foliis profunde cordatis, subsinuatis, dentatis, subtus tomentosis. *Hort. Kew.*

Tilia argentea *Jard. du Mus. d'Hist. Nat.*

This species is likewise a native of North America, but grows also naturally in Hungary; and Bruguière and Olivier met with it near Constantinople. Mr. Gordon brought it to England in 1767, and the late Mr. Aiton, his Britannic majesty's gardener at Kew, sent some young trees, about twelve years ago, to Messrs. Thouin and Cels, who have successfully cultivated it, the former in the garden of the museum of natural history, the latter in that of Arcueil. All the trees of this species now existing in France, have been ingrafted on the lime-tree commonly called *Tilleul d'Hollande*, and they thrive as well as if they lived in their native country. Some of them flowered and fruited in 1798 and 1799; and the seeds planted by M. Thouin are come up in such perfection, that we may hope to have soon a great number of these trees to adorn the gardens of the curious. Its *natural character* is as follows:

Root cylindric, perpendicular at first, afterwards divided into several branches, spreading near the surface of the earth, and furnished with a great number of very minute fibres.

Seminal leaves palmate, or divided into five unequal laciniae, the middle and lateral ones the largest.

Stem arborescent, cylindrical, very ramous, covered with a thick bark, and ash-coloured epidermis, smoother than that of other species.

Branches alternate, cylindrical, very divided, covered at the upper part with a thick ash-coloured down, which easily separates on gliding over it with the finger: the lower almost horizontal, the others more or less straight and shorter; *bracteoles* nearly two-ranked, of the same colour and form with the branches.

General oval, tomentose, of an ashy green colour.

Leaves roundish, heart-shaped at the base, serrated with unequal teeth, and sometimes sinuate, more or less acute at the top, vertical, petiolated, plane, with nerves very brochod, at first tomentose and of a snowy white on both surfaces, afterwards smooth and of a dark green on the upper surface, about four inches long and as many broad: *petioles* cylindrical, rather swelled at both extremities, diverging, tomentose, length nearly the third part of the leaf.

Stipules opposite, lanceolate-linear, obtuse, membranaceous, straight, striped, plane, caducous, of half the length of the petiole, and three lines wide.

Flowers collected in a close corymb, first of a sulphur colour, afterwards whitish, five lines long and of the same diameter: they emit a sweet scent resembling that of jonquils: *common*: *peduncle* at the side of the petiole, cylindrical and adhering in almost the whole extent of the lower half to the midrib of a bract, free and rather bent sideways at the upper part, and divided at the top into many tomentose pedicles of nearly the length of the petioles: *bracts* membranaceous, oblong, obtuse, pubescent, veined, rather longer than the peduncle, and about four lines wide.

Pedicles cylindrical, one-flowered, each with two bractes in the middle, almost straight, tomentose, and four times shorter than the peduncles:—*bractes* almost opposite, linear, membranaceous, straight, pubescent, caducous and very small.

Calyx: leaflets five, ovate-acuminate, convex and pubescent without, concave and tomentose within, marked with a longitudinal nerve, almost straight, green at the base, of a yellowish white above.

Corolla: petals five, oblong, nearly obtuse, and slightly crenate at the top, scaly inside near the base, almost straight, smooth, of a pale yellow, and rather larger than the divisions of the calyx—scales spatulate, hypogynous, opposite to the petals, of the same colour with them, and rather shorter.

Stamens: filaments filiform, straight before the discharge of the pollen, afterwards rather spiral, snow white, and the length of the scales: *anthers* bright yellow, roundish, straight, two-celled, with four furrows opening at the lateral ones.

Germen oval, tomentose, and whitish: *style* cylindrical, smooth, yellowish white, rather longer than the flower: *stigma* expanding, five-lobed, and of the same colour with the style.

Fruit: an ovate coriaceous nut, with five obsolete corners, tomentose, ash-coloured, one-celled when ripe, and containing one or two seeds.

The round-leaved lime-tree unites several advantages that render it desirable for ornamenting gardens: its leaves, thicker and more fleshy than those of the other species, resist the heat of summer better, and, by their vertical situation, form a foliage that affords a very cooling shade. The whiteness of their lower surface, the dark green of the upper, and the gold colour of the flowers, form a most pleasing contrast; to which may be added that this species surpasses the other in the profusion of its flowers, which are also of longer duration, and more fragrant.

6. *FILIA heterophylla* foliis ovatis, argute serratis, basi nunc cordatis, nunc oblique aut æqualiter truncatis, subtus tomentosis; nuce pisiformi.

Messrs.

Messrs. Fraser and Michaux met with this species in South Carolina, and I think it is also found in Maryland, since I have seen in the herbarium of M. Lamarck several specimens of it that were gathered in that province. It is distinguishable from the former by many characters. Its young branches and gemmæ are smooth, and of a purple colour inclining to black; the leaves ovate-acuminate, with a point, some almost heart-shaped, others equally or obliquely truncate, delicately serrated, smooth, dark green above, tomentose and white below: the point from which the lateral nerves issue, is furnished with a brush of reddish hairs. The peduncles, almost the length of the leaves, are three times longer than those of *Tilia rotundifolia*. The fruit is globular, nearly of the size of a pea, with five rather prominent nerves, among which run others less perceptible.

The late M. Michaux has informed me that this tree is found more especially in the maritime parts of Virginia and Carolina; but that it only attained the size of our apple-trees.

Obs. Lime-trees thrive best in a light, rather moist soil, of considerable depth. The species which I call *platyphyllos*, and its variety, have long since been made use of to ornament gardens; and, as they bear clipping without injury, form extremely pleasant alleys.

Lime-trees are generally propagated by layers, and exotic species are successfully engrafted on such as are indigenous to our climates. There are few trees that afford so many useful materials from every part. The outer bark is employed for making cordage, the inner furnishes nets to the Swedish fishermen, and to the shepherds of Carniola and some other countries a sort of stuff that is indeed none of the finest, but sufficient to protect them from the injuries of the air*. From Michaux we learn, that in the state of Connecticut, paper is made of the liber of *Tilia*.

* Linn. Iter Oeland. p. 44. et 63.—It. Scand. p. 50.

glabra. Carvers prefer the wood of the lime-tree to that of the poplar, on account of its finer texture, and its not being so liable to be worm-eaten: as it is also very light, its cork is employed for the manufacturing of gunpowder. The sap of the lime is as abundant as that of the birch and maple, and celebrated naturalists have been of opinion that, by submitting it to proper processes, it would yield a considerable quantity of sugar*.

The inhabitants of Sweden, Norway, Carniola, Switzerland, &c. carefully collect the leaves of the lime-trees for feeding their sheep and goats: they also serve as food for cattle; but Linnæus observes† that it injures the flavour of the milk of cows.

The flowers of every species of lime-trees diffuse a very sweet scent, and the bees visit them in preference on account of the great quantity of nectar they contain. Honey is very abundant in Lithuania, because lime-trees are so frequently met with in the forests of that country.

The fruit of the lime-tree had long been considered as perfectly inapplicable to any useful purpose, until Missa, member of the college of physicians of Paris, discovered a property in them which he was far from suspecting; for, pounding some of them together with a portion of flowers of the same tree, the product was a butyraceous substance, perfectly similar to chocolate. No great attention was paid to this discovery in France, but it soon became an object of curiosity abroad: Frederic the Great appointed Marcgraff to ascertain the correctness of the statement of the French physician; and the result of his experiments was ‡, that a sort of chocolate might indeed be obtained from the grains of lime-trees, but that, if prepared after the method pointed

* Adanson's *Familles des Plantes*, vol. ii. p. 380. † *Iter Scand.* p. 256.

‡ *Mém. de l'Acad. de Berlin* 1772, p. 3. et *Journ. de Physique* Avril 1779, tom. xiii. p. 215.

out by Missa, it could never be hardened like that made of cacao, that it was more liable to become rancid, and that it differed greatly from it, as well in consistence as in smell and flavour. Though the experiments of the Prussian chemist certainly prove that the discovery of Missa was not of such importance as he imagined, yet I thought proper to bring it into recollection in this place, as it is possible that, by making use of the fruit of some of the American species, the hopes entertained by him may be ultimately realized.

XV. ENSATARUM ORDO*.

Autore JOH. BELLENDEN GAWLER, *Armigero.*

ORDINIS CHARACTER.

COROLLA *supera*, *vix* unquam *infera*; *tubulosa*†, limbo *sexfido*, aut *hexapetalo-sexpartita*. *Stamina* 3, *laciniarum* *basi* *imposita*, *sæpius libera*, nec tamen *infrequenter cuniculato-connata*‡. *Antheræ* *biloculares*. *Stylus* *unicus*. *Stigma* e *simplicissimo* *seriatim* in *tria* *amplitudine petalode prædita* *procrescens*. *Capsula* *trilocularis*, *trivalvis*, *valvis medio septigeris*; *septis* (in *polyspermis saltem*) *ad marginem intimam utrinque seminiferis*: *semel atque iterum prodiit receptaculo centrali libero dotata*. *Semina* *ab uno in quolibet loculo*,

* *IRIDES Jussieu*. Capit ista divisio sexualis systematis ferme totam TRIANDRIAM MONOGYNIAM una cum nonnullis TRIANDRIÆ MONADELPHIÆ generibus.

† *Tubus*, e *laciniarum unguibus* *inter se conferventibus* *enascens*, *minime separat plantas corollis gaudentes usque basin partitis aliunde similes*.

‡ Non *pluris habenda* in hoc ordine *filamentorum Monadelphæ*, quam *supra memorata corollæ laciniarum brevior longiorve cohesio*, aut earum *absoluta distinctio*; in aperte ad idem ipsum genus *pertinentibus speciebus* *adest vel abest vicissim*, non alterum *haud reliquis æque commune præscribens signum*; *nulla certa porro astricta lege variat in diversis*, *modo filamentorum basi*, *mox medio tenus vel ultra*, *quandoque etiam per totam eorum longitudinem locum habens*.

vel

vel paucis atque uniserialibus gradatim per species numerosa, eodemque biserialia, evadentia.

OBS. Ensatae, si excipias suffruticosas WITSENIAS, in universum herbaceae. Radix aut rhizomatosa, aut bulbosa, aut tuberoso-bulbosa*, vel tuberosa†. Foliatio multimodis ensata, necnon exacte disticha, nisi in Caeco, in quo sane ambiens; haud raro pubescit; ne unquam maculatur. Inflorescentia modo spicatim educta, floribus aliquo spatio distinctis spathaque bivalvi exceptis, modo fasciculatim adducta istis contiguis, bractea solitaria interstinctis, inque fascem ab involucrio extimo collectis; perraro paniculata, quando omni perianthio caret.

GENERUM SYNOPSIS†.

Natura in reticulum sua genera connerit, non in catenam: homines non possunt nisi catenam sequi, cum non plura simul possunt sermone exponere.

Hall. Helv. 2. 130.

CROCUS.

GEISSORHIZA.

TRICHONEMA.

HESPERANTHA.

SPARAXIS.

* **BULBO-TUBER** constat e rhizomate gerente imas foliorum carnosae tumidas reliquias, concentrice conferruminatas, varie conglobatas, extusque plurimis (itidem ex ramentis foliaceis) tunicis fibroso-organicis liberis larvatas; quotannis evolvit novam sobolem, a qua exsuctum et confectum totum denuo exinanitur; hinc facile a perennante Bulbo distinguendum. Est praeterea bulbo-tuberis natura amygdalino-carnosa, durior, et farinaceo-desiccans, cum ea BULBI mucilaginosa magisque succulenta sit.

† **TUBER**, itidem annue renovatum, differt a praecedente, quod sit nudum, vel ola epidermide non separabili inductum, neve adeo manifeste ex foliorum basibus conflatum; in ENSATIS subinforme et in universum orbiculari-depressum, subtus umbilicatum extrudensque gemmam frugiferam radicatam quae fibras promittit distanter vel submoniliformiter tuberiparas. Cavendum ne cum duobus praedictis radicationis modis confundas quasdam ex aggestis atque coagmentatis rhizomatibus perennantibus enatas strues subbulbiformes, quales sunt apud WACHENDORFIAS spectandae.

‡ Cum ordinem incudi reddam extare adverto (praeter eas me olim in "THE BOTANICAL MAGAZINE" evulgatas) caesuras tres quas in genera elicire haud inutile fore existimaui, easdem proinde supra inserui nominibus vocatas

SPARAXIS.	ARISTEA.
IXIA.	† WITSENIA.
ANOMATHECA.	LAPEYROUSIA.
TRITONIA.	‡ MORÆA.
WATSONIA.	GALAXIA.
GLADIOLUS.	FERRARIA.
MELASPHÆRULA.	IRIS.
ANTHOLYZA.	MARICA.
BABIANA.	TIGRIDIA.
* WACHENDORFIA.	SISYRINCHIUM.
DILATRIS.	PARDANTHUS.

GENERUM CHARACTERES,

CUM SPECIBRUM § HUCUSQUE DESCRIPTARUM SUBJECTIS
SYNOPSISIDIBUS.

In classe maxime naturali genera difficillima sunt, neque a flore repeti possunt.
Hall. Helv. 2. 181.

*Male, si omnino error evitari nequit, species minus certas distinguere, quam
opprimere veras, quæ de plantarum historia evanescent, quam primum in varie-*
tatum ordinem rediguntur, capite quasi minores. Hall. Helv. 2. 197.

CROCUS.

Spatha bivalvis, pellucenter membranacea : valva interior
multo angustior, atque altera contenta. *Cor.* supera infun-

vocatas ANOMATHECÆ, (ἀνομας, θηκα; præ pruinata capsula singularis);
HESPERANTHÆ, (ἑσπερα, ανθος; cum flores vesperi se explicent); et PAR-
DANTHI, (παρδης, ανθος; corolla instar pardi pellis maculato-fulva).

* Hic forsitan interveniat XIPHIDIUM, genus mihi quidem propter exem-
plaria nimis manca male notum.

† TAPEINIAM suspicor facile WITSENIA excepturam fore quantum liceat
de habitu judicare; flores utique non vidi.

‡ Inter MORÆAM et LAPEYROUSIAM novum forte erit inserendum genus,
ex plantis quibusdam a Thunbergio in Dissertatione sua priori adnumeratis
(ut sunt e. g. ejus *M. spat. acea, filiformis, aphylla*, cum nonnullis aliis) post-
hac constituturum.

§ Dum unum tantum cuilibet subjungitur speciei synonymon, constanter
præfertur id tabula comitatum.

dibuliformis,

dibuliformis, erecta, tubus stipitatum elongatus, partim subterraneus: limbus pene æqualiter sexpartitus, amplus, regularis. *Stigm.* 3, involuto-complicata et plana, aut cucullato-cava, sursum latiora, crossa aut multifida.— (*Aliquando supprimitur valva interior. vid. Salisb. in Annals of Botany, v. 1. p. 120.*)

Obs. Radix bulbo-tuber vestitum, infra capillatum, alia nonnulla (rarius unicum) sessilia, sola frugifera, sub-biscapigera evolvens, ista dum increseunt et expandunt pristinum ~~seu~~ peritum exaugent atque opprimunt; ipsis quoque proximo anno easdem substituis vices. Corollæ laciniæ oblongæ vel sublanceolatae; tubus vaginatus. Folia plura radicalia, erecto-ambientia, anguste et acute linearia, carinata, stria argentea canaliculate depressa percursa, vaginis tenacius membranaceis atque remote imbricatis infra fasciata. Scapus uniflorus, in quolibet fasciculo communiter geminatus, angulatus; florifer alte subterraneus. Filam. brevia, fere antherarum longitudine, erecta, summo tubo insita, stylum filiformem stipantia. Stigmata non raro inaequalia. Germin terra reconditum, emicat demum facta matura capsula, tandemque dehiscit rotatim. Semina plura, majuscula, cornea, subrotunda, tunica subsucculenta teneriori tecta.

sativus. *Eng. Bot. t. 343. (autumnalis.)*

mœsiacus. *B. M.* t. 45. (vernus.)*

susianus. *B. M. t. 652.*

vernus. *Eng. Bot. t. 344.*

aphyllus. *Eng. Bot. t. 491.*

TRICHONEMA.

Spatha 2-valvis ultra medium corollæ producta, lanceolata, integerrima. *Cor.* tubus brevissimus, limbus amplus, æqualis, regularis. *Fil.* erecta, brevia, pubescentia, ore

* *B. M.* denotat "Curtis's Botanical Magazine."

tubi imposita; *antheræ* majusculæ, conniventes. *Stigm.* 3, bipartita, patentia, gracillima. *Sem.* plura globosa.

Obs. Bulbo-tuber ovato-conicum, tunica putaminæa crustacea vestitum, basi oblique semitruncatum, dimidia-tion-capillatum, sæpius cum fibra præcipua crassa subfusi-formi. Scapus in duos pedunculos æquales et subuni-flos sursum diffunditur, instruiturque ad divisionem brac-teis binis foliiformibus; dum floret sæpius terra hæret, cum pedunculi hunc geminatum mentiantur; fructifer vero totus effertur, hique furcatim revolutimque secedunt. Haud infrequenter caret et pedunculo et bractea altera. Folia angusta, linearia, utrinque acute tricostrata, costa media maxima folioque faciem subtetraquetram sæpe impertiente.

Bulbocodium. Jacq. Ic. rar. 2. t. 271. (IXIA.)

roseum. B. M. t. 266. (IXIA *bulbocodium*.)

cruciatum. B. M. t. 275.

ochroleuca. Jacq. Ic. rar. 2. 270. (IXIA.)

speciosum. Bot. Rep. t. 170. (IXIA.)

pudicum. Herb. Banks. Soland. (IXIA.)

GRISORHIZA.

Spatha 2-valvis partim herbacea, pro flore majuscula. *Cor.* regularis, subæqualis; tubus paulatim in faucem ampli-atus, rectus; limbus serpanitius, amplior, patens. *Stam.* erectiora. *Stylus* inclinatus. *Stigm.* 3, latiuscula, ad-oram fimbriatule crispata, revolutim patentia, antheras exsuperantia. *Caps.* scarioso-membranacea, ovali-tri-gona. *Sem.* numerosa, è minimis.

Obs. Bulbo-tuber ovatum, fastigiatum; putaminibus crustaceis, imbricato-suggestis, ima ora dentato-fissili in-flexaque (non ut in *LAPERROUSIA* explanato-patente) in-dutum. Folia subtria, radicalia communiter duo, cauli-norum parte inferna longinquius spathaceo-convoluta inflatioreque. Scapus uni-multiflorus, rachide serpentina vel

vel præflexuosa, frequentius refracto-supinata et secundo-florifera. Spathæ valvula exterior supra sphacelata et subcolorata, modo præciso-dentata, quandoque integerrima et acuta, nonnunquam medio dente aristato-producto. *Excisa* et *furva* species sunt insigniter ambiguae; habent TRICHONEMATIS bulbo-tuber, floris formam HESPERANTHÆ, foliorum humifusum ortum ut in ANOMATHECA, cum reliquis generis.

rochensia. *B. M. t.* 598. (IXIA.)

secunda. *B. M. t.* 597. (IXIA.)

sublutea. *Lam. Encyc.* 3. 335. (IXIA.)

inflexa. *De la Roche Diss.* (IXIA.)

hirta. *Thunb. Diss. p.* 9. (IXIA.)

obtusata. *B. M. t.* 672.

imbricata. *De la Roche Diss.* (IXIA.)

setacea. *Thunb. Diss. p.* 13. (IXIA.)

humilis. *Thunb. Diss. p.* 3. (IXIA.)

furva. *Herb. Banks.* (IXIA.)

excisa. *B. M. t.* 584. (IXIA.)

HESPERANTHA.

Spatha 2-valvis, herbacea, majuscula, ovali-lanceolata, naviculari-convoluta. *Cor.* tubus sursum paulatim ampliatus, limbus 6-partitus, regularis, ferme æqualis. *Stigm.* 3, longa, effusa, ad tubum usque distincta. *Caps.* oblonga, obtuse trigona, torulosa, membranacea. *Sem.* numerosa, fere subbaccata, rugosa atque e rotundis angulata.

OBS. Bulbo-tuber campaniforme indusiis amictum putamineis modo coriaceo-lentis, modo ligneo-duris, quandoque osseis atque jugis verticalibus angulatim percursis. Flores vesperi explicare, mane iterum se claudere coeperunt, inverso coordinatorum more, quas quoque persequuntur vices in spatium plurimarum dierum. Stigmata longiora, gracillima, linearia, canaliculata, laxa
atque

atque effuse projecta. Antheræ grandiores, leviter ap-
pictæ, interdum tremulo-incumbentes et versatiles. Se-
mina e minoribus. Folia haud raro plano-fistulosa, inde
speciem exhibentia crassam, nunquam vero videntur
teretia.

virginea. *Herb. Banks.* (IXIA.)

radiata. *B. M. t.* 573. (IXIA.)

falcata. *B. M. t.* 566. (IXIA.)

cinnamomea. (*Thunb. Diss. de IXIA cum tab.*)

angusta. *Jacq. Ic. rar.* 2. t. 279. (IXIA.)

pilosa. *Thunb. Diss. p.* 8. (IXIA.)

SPARAKIS.

Spatha 2-valvis, grandior, scarioso-membranacea, ora sphace-
lato-lacera. *Cor.* pars inferior infundibuliformi-tubulosa;
limbus vel regularis et pene æqualis, aut irregularis itidem-
que inæqualis. *Stam.* recta atque inclinata, rarius adscen-
dentia. *Stigm.* 3, recurvo-patentia, antheras excedentia.
Caps. oblongo-rotunda, nodulosa. *Sem.* plurima, globosa.

Obs. Bulbo-tuber ovatum cum acumine, obtectum tuni-
cis e reticulis sericeo-fibrosis. Caulis fere semper ad
folia axillariter bulbifer. Folia 6—10, ensiformia, striis
tenuibus crebris celata. Flores majusculi, remotiores,
nunquam contigui atque numerosi. *Spatha* sæpius tubi
longitudine vel ultra. Limbus modo stellato-explanatus,
modo deorsum connivens, modo bilabiatus lacinia su-
prema galeatim erecta; hic vero organa adscendunt;
cum aliter inclinent et divergant. *Spatha* generi dat
characterem nomenque.

anemoneflora. *Jacq. Ic. rar.* 2. t. 273. (IXIA.)

fragrans. *Jacq. Ic. rar.* 2. t. 274. (IXIA.)

tricolor. *B. M. t.* 381. (IXIA.)

galeata. *Jacq. Ic. rar.* 2. t. 258. (GLADIOLUS.)

bicolor. *B. M. t.* 548. (IXIA.)

grandiflora. *B. M. t.* 549. (IXIA.)

bulbifera. *B. M. t.* 545. (IXIA.)

fimbriata. *Lam. Encyc.* 3. 337. (IXIA.)

lacera. *Herb. Banks.* (IXIA.)

IXIA.

Spatha bivalvis. *Cor.* tubus gracilis, pedunculoideus, erectus, superius vix dilatatus; limbus ferme ad tubum usque partitus, regularis, subæqualis, patens; laciniae planiores, raro deorsum in faucem conniventes aut breviter turbinato-conferventes. *Fil.* limbo valde breviora, aut patentia, aut conflectentia, aut fasciculata, vel etiam cuniculato-concreta. *Caps.* membranacea, orbiculato-ovata, torulosa. *Sem.* plurima, globosa.

Obs. Hujus generis character adeo hactenus laxè definitus exstitit, ut facile totam exceperet ordinem; etiam nunc, post nonnulla integra subtracta genera, eam præsentio certas retinere species pro nimis anomalis verisimiliter habituras, nec libuit ulterius separare. Bulbo-tuber depresso-rotundum, interdum plano-convexum atque umbilicato-depressum; semel succulentius et subdeforme, quando tunica pertenui laxa et præmolli indutum; in *crispa* hocce angustius pyramidatum, et indusiis stupaceo-textilibus involutum. Caulis teres, gracilescens, sæpenumero ramosus. Corollæ limbus fere rotatus, perraro ima parte campanulato-vel turbinato-arctata, semel faciem præbens tantisper irregularem. *Spatha* sæpius membranacea, tuboque multo brevior, bis terve majuscula prætenuis atque scariosa.

* *Limbo arctato.* *Spatha* grandiore, scariosa, prætenui.

pendula. *Willd. Sp. Pl.* 1. 204.

capillaris. *B. M. t.* 570. 617.

** *Tubo gracili spatha valde longiore; limbo patentissimo.*

aristata. *B. M. t.* 589.

patens. *B. M. t.* 522.

flexuosa. *B. M. t.* 624.

.. hybrida.

hybrida. *B. M. t.* 128. (flexuosa.)

conica. *B. M. t.* 539.

monadelpha. *B. M. t.* 607.

columellaris. *B. M. t.* 630.

maculata. *B. M. t.* 549.

erecta. *B. M. t.* 622.

*** *Stigmatibus supra antheras elevatis; bulbo-tubere subdeformi.*

crateroides. *B. M. t.* 594.

**** *Tubo prægracili; antheris curtatis; stigmatibus hianterfissis.*

polystachia. *B. M. t.* 629.

scillaris. *B. M. t.* 542.

crispa. *B. M. t.* 599.

ANOMATHECA.

Spatha 2-valvis, pusilla, herbacea. *Cor.* hypocrateriformis, tubus fauci recto-continuus, anguste turbinatus; laciniæ subirregulares, spathulato-obovatae. *Stigm.* 3, gracilia, bipartita. *Caps.* ovato-rotunda, papilloso-pruinata. *Sem.* benemulta, rotunda.

OBS. Bulbo-tuber ovatum, e majoribus, indusio stupaceo vel laxius fibroso-textili obductum. Caulis ramosus, sæpius multiflorus. Folia plura, subundulata, rugosulo-adducta, intus deorsum insigniter excisa; e terra obliquatim enascentia, diutius subhumifuse inclinata, dum erectiuscula. Antheræ erectæ, accumbentes, parallelæ. Papillosa capsulæ scabritie a reliquis coordinatis facillime dignoscenda.

juncea. *B. M. t.* 606. (LAPEYROUSIA.)

TRITONIA.

Spatha 2-valvis, supra sphacelata, acuminata vel dentato-obtusata. *Cor.* tubulosa resupinata vel non, limbo 6-partito; tubus de (in grandifloris) laciniis pluries brevior, usque ad (in longifloris) iisdem 4-plo longiorem; in pri-

oribus faux hinc gibbose turgida, laciniae obtusatae, unguiculatae; in reliquis hæ vel rotato-patentes vel subbilabiato-digestae atque aliquanto dispares cum una latiore. *Stam.* nunc adscendentia et contigua, antheris paralleliter digestis, nunc assurgentia et divergentia. *Stigm.* 3, patentia. *Caps.* ovato-rotunda, torulosa. *Sem.* plurima, rotunda, e minoribus.

Obs. Genus constans ex speciebus quodam habitu levius sese prodentibus, cujus character vero definitu difficilissimus. Bulbo-tuber depresso-ovatum, vel rotundum cum acumine, tunicis e fibris reticulato-organicis quarum maculae in exterioribus sæpe majusculae tectum. Folia latius graminea, plura, perraro crispate circumscripta. Flores plures, polymorphi; hic limbo campanulato, magno, regulari, resupinato, laciniarum laminis latis, tubo brevi, fauce inflato-patente; illic corolla mediae magnitudinis, tubo productione, fauce turbinata, laciniis subbilabiato-digestis, unica latiore, laminis oblongis parum dilatatis; alio laciniis lineari-oblongis, rotato-patentibus, æqualibus, fauce paulo latescente, tubo prælongo. Stamina in bilabiatis adscendentia, in resupinatis regularibus assurgentia; antherae in rotatis contiguae, accumbentes.

crispa. *B. M. t.* 678.

striata. *Jacq. Ic. rar. 2. t.* 260. (GLADIOLUS.)

capensis. *B. M. t.* 618.

longiflora. *B. M. t.* 256. (IXIA.)

lineata. *B. M. t.* 487. (GLADIOLUS.)

securigera. *B. M. t.* 383. (GLADIOLUS.)

flava. *Hort. Kew. 1.* (GLADIOLUS.)

refracta. *Jacq. Ic. rar. 2. t.* 241. (GLADIOLUS.)

squalida. *B. M. t.* 581.

fenestrata. *B. M. t.* 704.

crocata. *B. M. t.* 184. (IXIA.)

deusta. *B. M. t.* 622.

miniata. *B. M. t.* 609.

WATSONIA.

WATSONIA.

Spatha bivalvis adpressa, supra sphacelata. *Cor.* infra tubulosa, limbo suppari-sexpartito, laciniis planis regularibus, modove subbilabiatis irregularibus. *Stam.* ascendentia, antheris contiguis parallelis, æquata fronte, rarius trifariam tendentia. *Stigm.* 3, gracilia, bipartita, recurvo-patentia. *Caps.* elongata, obtuse trigona, cartilagineo-occallescens. *Sem.* numerosa, deorsum imbricata, nucleo imo angulato, ala summa membranacea bracteata, minus sæpe angulata, ala suppressa.

Obs. Bulbo-tuber orbiculatum, sæpius depressum, corticibus fibroso-organicis, coriaceo-tenacibus, extimis interdum subligneis et crasse reticulatis tectum; summum novorum par evolvens, per quod intervenit caulis, hic rara exceptione priscum continuans bulbo-tuber moxque simul periturus; in aliis e recente effertur is gemma huicque superstiti adfixus deperit seorsim; haud raro sublignescit, vix unquam non ramosus, ramis adpressis. Faux communiter in cylindrum educitur tubo subæqualem, rarius in turbinem adducitur brevior, dum trifariam divergunt stamina. Semel aut bis degenerant flores in bulbillos; ad caulem ferme semper axillari-ter bulbifera; folia sunt ensiformia, firmiora, crebrius lucida, interdum fistulose cava.—Cum speciminis ex hortulo nostro lecti a novello divellamus vetustum (nequidem exarefactum) bulbum, vi medio dirumpitur, digitisque pressus, undique de poris crebris grandioribus scatere cernimus non mediocrem gummi modum; dum haud ita multo post in exemplaribus nonnullis de C. B. Spei advectis, deprehendimus gummosum huncce humorem sponte exsudatum, inque glebam mole nucis moschatæ coactum extus adhærentem.

punctata. *Bot. Rep.* t. 177. (IXIA.)

plantaginea. *B. M.* t. 553.

spicata. *B. M.* t. 523. (IXIA *fistulosa*.)

marginata. *B. M.* 608.

rosea. *Bot. Rep. t.* 335. (*GLADIOLUS pyramidatus.*)

brevifolia. *B. M. t.* 601.

aletroides. *B. M. t.* 533. 441. (*A. merianella.*)

roseo-alba. *B. M. t.* 537.

angusta. *Jacq. Ic. rar. 2.* (*ANTH. merianæ var.*)

humilis. *B. M. t.* 631.

Meriana. *B. M. t.* 418. (*ANTHOLYZA.*)

iridifolia. *B. M. t.* 600.

GLADIOLUS.

Spatha bivalvis, convoluto-lanceolata, majuscula. *Cor.* deorsum tubulosa et infundibuliformis; limbo sexpartito, irregulari, inæquali. *Stam.* adscendentia. *Anth.* parallelæ, a medio dorso pensiles. *Stigm.* 3, e bilamellatim complicatis explicantia, subobcordato-latescentia. *Caps.* ovato-oblonga, obtuse trigona, lenta. *Sem.* numerosa acervatim structa, membranaceo-plana, nucleo parvulo, compresso, extumesciente; (*raro pauciora atque subbaccato-rotunda.*)

OBS. Bulbo-tuber ovato-rotundatum, subtus umbilicatum, cui tunicae fibroso-textiles sæpe stupaceo-molles, modo cortices duritie fere putaminca præditæ. Folia ex anguste linearibus lanceolata, sæpius plana nervo principi, interdum vero ob costam mediam utrinque laminatim prominentem fiunt cruciate quadrangula, quandoque ex marginibus elevato-costatis semitetraquetra, lateribus paginate dilatatis. Faux communiter e tubo tereti turbinatim educta, rarissime in cylindrum elongata. In *cunonia* bulbo-tuber subnudatum fibris sparsim bulbiparis; spica insigniter disticha; scapus crassior firmior solito; cætera compar generis.

Cunonia. *B. M. t.* 343. (*ANTHOLYZA.*)

Watsonius. *B. M. t.* 450, 569.

quadrangularis. *B. M. t.* 567.

namaquensis.

- namaquensis*. *B. M. t.* 592.
alatus. *B. M. t.* 586.
viridis. *Hort. Kew.* 3. *p.* 481. *Herb. Banks.*
viperatus. *B. M. t.* 688.
permeabilis. *De la Roche Diss.* 27. *cum ic.*
versicolor. *B. M.* 556.
tristis. *B. M. t.* 272.
hyalinus. *Jacq. Ic. rar.* 2. *t.* 242.
tenellus. *Jacq. Ic. rar.* 2. *t.* 248. *coll.* 4. *t.* 3. *f.* 1.
setifolius. *Thunb. Diss. de Glad.* 18.
gracilis. *B. M. t.* 562.
carinatus. *B. M. t.* 578.
hirsutus. *B. M. t.* 674, 727.
flexuosus. *Thunb. Diss. de Glad. t.* 1. *f.* 1.
carneus. *B. M. t.* 591.
cuspidatus. *B. M. t.* 582.
blandus. *B. M. t.* 625, 645, 648.
angustus. *B. M. t.* 602.
undulatus. *B. M. t.* 538, 647.
floribundus. *B. M. t.* 610.
Milleri. *B. M. t.* 632.
cardinalis. *B. M. t.* 135.
byzantinus. *B. M. tab. nondum evulgata.*
communis. *B. M. t.* 86.
segetum. *B. M. t.* 719.

MELASPHÆRULA.

Spatha 2-valvis, divaricato-patens, elliptica. *Cor.* hexa-
 petaloideo-sexpartita, æqualis ; laciniae in binis similibus
 labiis explicitæ, subcampanulato-patentes, singulæ seta
 præfixæ. *Stam.* adscendentia. *Stigm.* 3, recurvo-
 patentia. *Caps.* contracto-turbinata, trilobato-trigona.
Sem. globosa, pauca.

OBS. Bulbo-tuber depresso-ovatum, basi truncato-pla-
 num, tunica fibrose subputaminea crustacea tectum.

Folia graminea, plura, costa media utrinque prominula; caulis istis plurimum altior, teres, gracilescens, paniculato-ramosus, ad quamque furcam foliolis trinis lineari-subulatis stipulatus; ramuli brizoides vel elastico-capillacei, rachides secundo-florigeræ, perarcuatim flexuosæ. Extima spathæ valva oram habet latius membranaceam. Corolla facillime caduca; laciniae perbreviter junctæ, elliptico-lanceolatæ, parum inæquales. Stigmata imminent antheris. Capsula chartaceo-membranacea. Semina rubella, pro flore majuscula, 1—3 in quoque loculo. Ex Jacquino caulis axillariter bulbiferus: bulbilli globosi, nitidi, nigerrimi; hi quidem nondum nobis sese obtulerunt neque tales memorat Thunbergius.

graminea. *B. M. t.* 615.

ANTHOLYZA.

Spatha bivalvis, e brevioribus ovato-convoluta, integra, stricta. *Cor.* tubus gracilis, spathæ subæqualis, angulato-striatus; faux vel subnulla vel etiam cylindraco-producta et tubo longior; limbus irregularis, inæqualis, ringenter difformis. *Stam.* adscendentia. *Stigmata* 3, gracilia, simplicia. *Caps.* (eam *æthiopicæ* intelligo quam solam vidi) depresso-sphærica, coriacea. *Sem.* plura magna, depresso-globosa, cornea, tunica sicca, tenace, conferruminate corticata.

Obs. Bulbo-tuber in *æthiopica* depresso-rotundatum, subrepenter soboliferum, sobolibus cæspitosim remotius vero caulem circumstantibus; ea aliorum non vidi. Folia de numerosis cum latitudine iridioides tandem pauciora et filiformia evadentia; hic nervosa, rigida, illic tenuia, lenta. Scapus teres, simplex, strictus, longe aphyllus. Flores distichi, plurimi, spicati.—Species nonnullas infra adjicimus in speciminibus tum bulbo tum fructu carentibus observatas, quæ posthac, dum rectius innotuerint, *GLADIOLO* vel *WATSONIÆ* forte erint subjiciendæ.

montana?

montana? *Thunb. Diss. p. 8.* (GLADIOLUS *Thunb. et Willd. ut et GLAD. parviflorus Jacq. et Willd.*)

cafra? *Herb. Banks.*

lucidor. *Thunb. Diss. 4.*

æthiopica. *B. M. t. 561.*

BABIANA.

Spatha e majoribus, trivalvoidea, intima valva partita vel interdum profunde fissa repleta hyalino interstincta. *Cor.* deorsum infundibuliformiter tubulosa, limbus 6-partitus regularis et subæqualis, modo subirregularis, vel etiam maxime difformis. *Stigm.* 3, patentia, gladioidea. *Caps.* rotundato-ovata, coriacea, torosa. *Sem.* plura baccata, globosa, inferius attenuata, denuo corrugata fere mutua pressione deformata.

Obs. Bulbo-tuber vestitum tunicis fibroso-membranaceis, scariosis, in universum ovato-pyramidatum sursum longe decrescens et quasi caudatum, infra umbilicatum, terra profunde insitum. Folia plicata, petiolis alato-linearibus, convolute vaginantibus; frequentissime (semperne?) pubescentia. Caulis crassior, sæpius ramosus, pubescens. *Spathæ* eundo sursum minores. Flores haud infrequenter in eadem planta tum regulares, tum irregulares; inflexione laciniarum necnon tubi longitudine mire ludentes, extus frequentissime pubescentes. Stamina raro trifariam divergentia, vulgo adscendentia. Seminalis tunicæ parenchyma pulposum, fere atrosanguineum atque mollissimum, nunquam maturatione prorsus evanidum. Foliorum hirsuties aliquando per ætatem deponitur; ut eorum quodam juniora hirsuta, senescentia nuda fiunt.

ringens. *Comm. Hort. 1. t. 41.* (ANTHOLYZA *Thunb. Diss. 7.*)

Thunbergii. *Thunb. Diss. 7.* (ANTHOL. *plicata.*)

tubiflora. *B. M. t. 680.*

spathacea.

spathacea. *B. M. t.* 638.

sulphurea. *Jacq. Ic. rar. 2. t.* 239. (GLADIOLUS.)

stricta. *B. M. t.* 621. 637.

rubrocyanea. *B. M. t.* 410. (IXIA.)

villosa. *B. M. t.* 583.

obtusifolia. *Nobis IXIA villosa (Jacq. Ic. rar. 2. t.* 284.)

disticha. *B. M. t.* 626.

mucronata. *Jacq. Ic. rar. 2. t.* 253. (GLADIOLUS.)

sambucina. *Jacq. Hort. Schænb. 1. t.* 15. (GLAD.)

plicata. *B. M. t.* 576.

Huc quoque, ut sane suspicor, *ANTHOLYZA nervosa Thunb.*
Diss. 6.

WACHENDORFIA.

Per. nullum. *Cor.* infera, hexapetaloideo-6-partita, irregularis parum inæqualis, explanato-patens, lacinia suprema basi utrinque appendiculata. *Stam.* assurgenter porrecta, divergentia. *Stylus* lateraliter obliquatus. *Stigm.* simplicissimum. *Caps.* velata, acute lobato-triquetra. *Sem.* loculorum angulo interno ope funiculi crassioris brevis adfixa; unicum in quolibet loculo.

Obs. Radix rhizoma perennans, carnosum, bulbiceps modo superficie terræ æquatum fibrasque crassas flaventes demittens, vulgatius tamen subterraneum et gemmiferum, plurimum etiam multiplex et aggesto-coagmentatum struemque subbulbiformem sæpe cylindraceo-productam et annulatam conficiens; scatet ista compages quodam mucoso succo, flavescit, nec habet indusium separabile, lucetque. Folia palmoidco-plicata, infra petiolatim arctata necnon conduplicanter vaginantia, modo perennia, frequentius vero annua. Caulis erectus, annuus, cavus, paniculato-ramosus ramulis racemose multifloris foliolis vagis sphacelatis dissito-squamatus, nec vidimus nisi pubescentem. Corolla resupinata? lacinia suprema brevi mellifluo deflexo subulato et angusto canali utrinque
ad

ad basin aucta; ista, cum vesperi sese convolvat flos, tanquam deficientis spathæ vices fungens, cæteras superintegrit partes. Stylus aristatim perstat. Capsula circumferentia turbinato-rotunda cum lobis declive compressis et argutis hirsuta atque corollæ ramentis subvelata. Semina ex rotundis varie pressa, ut quandoque sint pene semilunata, lente muricata, alias papillose scabrata, aut quoque subglabra.

thyrsiflora. *Burm. Monogr.* 2. f. 2.

hirsuta. *B. M. t.* 614.

paniculata. *B. M. t.* 616.

DILATRIS.

Per. o. *Cor.* supera hexapetalo-partita, patula, æqualis, persistens. *Fil.* porrecto-divergentia. *Stigm.* simplicissimum. *Caps.* crustaceo-putaminea, inflatiuscula. *Recept.* centrale, liberum, septigero-triquetrum, pyramidatum. *Sem.* tria plana, orbiculata, cartilagineo-alata; unum cuique receptaculi faciei interangulari peltato-adnatum.

Obs. Radix rhizoma, reliquiis foliaceis squamæformibus sæpius larvatum; folia numerosa, ensiformia, rigidiora, glabra, disticha, deorsum equitantia. Caulis flos atque capsula pubescentes; prior distanter foliosus, foliis radicalibus multo altior, simplex, terminatus panicula multiflora, cymose, corymbosa, thyrsoides vel etiam spicatim digesta; pedunculi bractea angusta squamæformi instructi. Capsula hirta, emarcida, corolla coronata, et tribus suturarum vestigiis obiter notata; receptaculi alæ intergerinæ istis ex asse oppositi cavitatem in tres loculos separant.

corymbosa. *Berg. cap.* 9. t. 3. f. 5.

viscosa. *Willd. Sp. Pl.* 1. 247. *Herb. Banks.*

paniculata. *Id. eod. Herb. Banks.*

ARISTEA.

Inflor. fascic. valvulis squarrose laxatis vel etiam herbaceis et arcte convolutis. *Cor.* hexapetalo-sexpartita, regularis, inæqualis, explanata. *Stam.* porrecta, inclinata, recta, divergentia. *Stigm.* vel unum hians, necnon obiter trifidum, aut laminæ 3, breves, latiusculæ, patentes. *Caps.* lobato-triquetra lobis plano-compressis, interdum obtuse prismatica; de brevi et latiori speciatim evadens columnaris et gracilior. *Sem.* unius ordinis, oblonga, in longum compressa et fere plana.

Obs. Radix rhizoma lignescens, fibrosum. Folia perennia, numerosa, disticha, deorsum equitantia, ensiformia, plana firmiora, lævia, nervo nullo præcipuo. Caulis annuus, centralis, haud raro sublignescens atque ramosus. Fasciculi nunc arcte nunc laxè colligati, modo simplices et pauciflori involueroque herbaceo conduplicatim coarctati, modo capitatum collecti (rarius composito-capitatum) atque multiflori, cincti involucris (interdum etiam involucellis) scarioso-membranaceis, atque squarroso-solutis. Post anthesin in columellam spiralem persistentem arctissime se contorquet corolla, occalescitque. Semina nunc 2—3 in singulis loculis, nunc plurima.

cyanea. *B. M. t.* 458.

capitata. *B. M. t.* 605.

spiralis. *B. M. t.* 520. (MORÆA.)

melaleuca. *Ic. cap. Cod. Banks.*

pusilla. *Thumb. Diss. p.* 7. (MORÆA.)

WITSENIA.

Inflor. aut fasciculata, involuero bracteis pluribus similibus minoribus deorsum gradatim descrescentibus quasi calyculato, aut paniculatim educta singulo flore propria bractea excepto. *Cor.* regularis, æqualis, vel tubulosa

losa limbo sexpartito, vel tota hexapetalo-partita. *Stam.* erecta laciniarum basi infixa. *Stigm.* levissime trifidum. *Caps.* putaminea, trifariam dehiscens. *Sem.* plura angulato-pressa.

Obs. Suffrutices superius paniculato-ramosi. Radix rhizoma ligneum, fibratum, abiens in caulem sursum foliis obtectum, ancipitem, adpresse ramosum; inferius articulatum cicatrizatum, articulis eundo brevioribus, de-nuoque ad folia confertissima; hæc perennia, sursum tendentia, flabellatim disticha, basin versus imbricato-equitantia, lineari-ensiformia, conduplicanter fissilia; superiora longiora, inflorescentiam includentia. Capsula pro plantæ magnitudine parvula. Plurima habet LAPEYROUSIÆ a qua proxime distat. Character de exemplariis desiccatis, integerrimis vero, desumptus. Neque prætereundum est, quod solam plantam frugiferam in paniculam productam observaverim, uti et solam floriferam involucris fasciculatim obvallatam, alia nulla vel minima inter eas emicante discrepantia; deindene conjicere licebit utramque ad eandem ipsam pertinere speciem; atque fasciculum floriferum procrecere in paniculam frugiferam? Id soli patebit cultori. Si ita quidem foret pariter fuerit mutanda generici characteris pars primaria.

partita. *Nos in Herb. Hibbertiano.*

maura. *Thunb. Nov. Gen. cum tab.*

fruticosa. *Thunb. Diss. de IXIA, cum tab.*

LAPEYROUSIA.

Inflor. spathaceo-bivalvis, necnon, perraro sane, in fasciculum adducta, intimis de more suppressis valvis. *Cor.* hypocrateriformis; tubus gracilis, longior, in faucem turbinatam et recto-continuum paulatim latescens; limbus 6-partitus subæqualis, regularis, vel etiam irregularis, tubo nunquam non brevior. *Stigm.* 3, gracilia, bipartita patentia.

patentia. *Caps.* membranacea, lobatim triquetra, lobulis declive compressis. *Sem.* numerosa, triedra, biserialia, aciebus extenuatis.

OBS. Bulbo-tuber campaniforme, amictum putaminibus perennantibus crassioribus fibroso-organicis, quarum extimæ rimosæ, ima ora explanato-patula atque dentatim fissa; in quibusdam exemplariis spontaneis annosis vidimus ex iis struem altitudine certe pollicari enatam esse. Caulis communiter præ decurrentibus foliis atque spathis alato-anceps vel triqueter, haud raro lignescens speciemque omnino fruticulosam præ se ferens. Folia ensiformia disticha, nervosa, modo basin versus longe nonnunquam etiam tota fissilia, nunc conduplicata, minus frequenter subplano-dehiscentia. In vegetis præsertim in istis de natali solo advectis, spatharum oræ et carinæ sæpe strigoso-scabratæ sunt. Advertendum est productam bivalvem inflorescentiam in fasciculatam univalvem cogi posse; neque proinde genus dividi jubere.

fastigiata. *Lam. Encyc.* 3. 337. (IXIA) *si diversa a sequente.*

corymbosa. *B. M. t.* 595.

falcata. *Thunb. Diss.* 4. *tab.* 1. *f.* 3. (GLADIOLUS.)

fissifolia. *Jacq. Ic. rar.* 2. *t.* 268. (GLADIOLUS.)

anceps. *Jacq. Ic. rar.* 2. *t.* 269. (GLADIOLUS.)

silenoides. *Jacq. Ic. rar.* 2. *t.* 270. (GLADIOLUS.)

fasciculata. *Nos.* (GALAXIA *plicata* *Jacq. Ic. rar.* 2. *t.* 291.

IXIA *heterophylla* *Willd. Sp. Pl.* 1. *p.* 159.)

MORÆA.

Inflor. fasc. *Cor.* hexapetalo-sexpartita, subinde tubulosa, solo limbo partito; lacinia vel parum inæquales, aut etiam admodum impares itidemque diffformes. *Stam.* erecta, trifariam divergentia, nec infrequenter cylindrico-connata, stigmatum faciebus accumbentia, minus sæpe vaga atque horum laciniarum fissuras intercedentia.

- *Stigm.* 3, petaliformia aut imminuto-subpetaliformia, involutum et prædispariter bilabiata atque bifida, interdum filiformiter gracilia necnon ad stylum usque bipartita. *Caps.* de crassa et fere globoso-curtata seriatim in columellam obtuse trigonam educta. *Sem.* numerosa, biserialia, ex orbiculatis varie pressa.

Obs. Bulbo-tuber subsphæricum, sursum acuminatum, modo vel longinque, opertum corticibus fibroso-organicis, quarum extimæ fere crasso-lignescences atque craticulatim rimosæ, per has sparsim aguntur fibræ rariores. Radix interdum fibrosa, habens rhizoma aliquando in caudicem cicatrizatum abiens; hic utique folia plurima perennia, plano-ensata, flabelloidee divergentia, inferius imbricato-equantia; in reliquis vero eadem annua paucaque, ex origine fistulose vaginantia quasi semifistulose dehiscentia atque in caudam strictam tereti cuspidatam et varia longitudine desinentia. Caulis vulgo culmaceus, subteres, polystachius, ad nodos foliis spathæformibus stipulatus, rarius strictissimus ex principio crasso et subligneo. Corolla generatim præfugax, involutum, insolenter sane convolutum atque spiraliter, deflorescens; attamen semper paulo mox decidua, neve ut in vicina sua proxima *ARISTEA* occalescens et persistens; laciniæ unguiculatæ, unguibus erectius conniventibus, vel etiam subrotatim explanatis et fere oblitteratis, nonnunquam quoque in tubum variæ mensuræ concrescentibus; interiores tres perraro omnino desunt, aut ita raro quidem perexiguiores. Filam. libera, vel modo medio tenus, vel tota cuniculato-conferventia. Ex prædictis intelligitur discrepantia inter *IRIDEM* et *MORÆAM* ad utriusque mutuam habitus disparilitatem resecari, ad summum ex iis solis manentibus illius corollæ æquabiliore expansione, cum forsitan ejusdem tubulosarum tubo cavo qui in *IRIDI* sæctus. Nequaquam idcirco sunt commiscenda genera, ea enim ad naturæ normam concinnata,

cinnata, extremis ambiguis perpetuo cohesura speciebus, strictiora frustra repeterentur. Nedum libet quod tam aperte affines in nova cæderentur genera, eo minus quod ob unius vel alterius arbitrarie præpositi: atque sæpius invalidi signi convenientiam, aliis pluribus sigillatim forte collective certo præstantioribus in remotiora detruderentur; uti ex. gr. quando ad GALAXIAS amandatam adverteremus Ixiam monadelphum; Ixias, Moræam virgatam; Sistrinchia, Moræam collinam; Gladiolos, Lapeyrousiâ ancipitem, dum L. corymbosa Ixiis excipi linquatur, cum hujusmodi aliis; ubi posthabitis plurimis manifestioribus magisque stabilibus notis, iis obtemperatur paucioribus et e perquam inconstantioribus temere desumptis. Semina semel sicco-baccata, planeque pressa; hic tunica extima spongiose vel suberose parenchymatosa, qualis communiter in IRIDI obvenit.

virgata. *Jacq. Ic. rar. 2. t. 228.*

elegans. *Jacq. Hort. Schoenb. v. 1. t. 2.*

flexuosa. *B. M. t. 695.*

polyanthos. *Thunb. Diss. n. 14.*

collina. *Jacq. Ic. rar. 2. t. 220.*

pavonia. *Bot. Rep. t. 364. (IRIS.)*

tripetala. *B. M. t. 702.*

tricuspis. *B. M. t. 696, et 168. (IRIS pavonia.)*

villosa. *B. M. t. 571.*

unguiculata. *B. M. t. 593.*

plumaria. *Thunb. Diss. no. 16. (IRIS.)*

viscaria. *B. M. t. 587. (IRIS.)*

bituminosa. *Thunb. Diss. t. 2. f. 2. (IRIS.)*

iridioides. *B. M. t. 693.*

ramosa. *Thunb. Diss. n. 24. (IRIS.)*

polystachia. *Thunb. Diss. n. 40. (IRIS.)*

angusta. *Thunb. Diss. n. 28. (IRIS.) Ic. Pl. Cap. in Mus Banks.*

setacea. *Thunb. Diss. t. 1. f. 1. (IRIS.)*

longiflora.

longiflora. *B. M. t.* 712.

edulis. *B. M. t.* 577. *Ic. Pl. cap. in M. Banks.* var.*
lutea.

tristis. *B. M. t.* 577. (IRIS.)

crispa. *B. M. t.* 759. *Thunb. Diss. t. 1. f. 1.* (IRIS.)

papilionacea. *B. M.*

minuta. *Thunb. Diss. n. 2.* (IRIS.)

ciliata. *Thunb. Diss. n. 1.* (IRIS.) *Ic. Plant. cap. in M.*
Banks.

Sisyrinchium. *Lil. à Redouté.* (IRIS.)

GALAXIA.

Inflor. folioso-fasciculata. *Cor.* infundibuliformi-tubulosa;
limbo plano, æqualiter patente; laciniis subæqualibus,
tubo brevioribus. *Fil.* in cylindrum connata. *Stigmata*
tres laminæ, latiusculæ, recurvo-patentes, canaliculato-
complicatæ; ora eroso-fimbriata, crispa. *Semina* bise-
rionalia, numerosa.

Obs. Genus totum pygmæum. Bulbo-tuber ferme *Morææ*.
Cauliculus stipitiformis, brevissimus, foliorum
fasciculo comose terminatus, e quo proveniunt flores
plures, sessiles, ephemeri, folia vix superantes, singuli
bractea propria membranacea suffulti. *Fructus Morææ*,
sed minor.

graminea. *Jacq. Collect.*

ovata. *Bot. Rep. t.* 94. et 164.

minuta. *Thunb. Diss. t. 1. f. 1.* (IXIA.)

FERRARIA.

Inflor. fasciculata; involucri lanceolato-turgido. *Cor.*
hexapetalo-sexpartita, regularis, unguibus arrecte conni-
ventibus, laminis parum inæqualibus, rotato-reflexove
patentibus, ora præcrispa fimbriatis. *Fil.* cuniculato-

* *M. Banks.* denotat Museum illustrissimi regis societatis præsidis.

connata. *Stigm.* 3, recta, petaliformia, bipartita, capillaceo-multifida, in penicillum verticali-trifrontem convergentia. *Caps.* coriacea, tereti-trigona, acuta. *Sem.* numerosa, baccata, orbiculato-orata, vertice umbilicatum depresso.

Obs. Radix tuberosa. Caulis sursum ramosus, crebroque ex numerosis et contiguis involucriis herbaceis faciem exhibens foliosam. Folia crassiuscula tundo sursum breviora, nec multa. Flores ephemeri, succulenti, fragiles; unguibus carnosiss ad basin scrobiculata didyma melliflua insculptis; laminis ad latera deflexis, medio convexis, ora lichenoides crispata. Antheræ crassiores, didymobiloculares. Stigmata bilamellatim involuto-complicata, indeque si velis bilabiata. Germen atque capsula inclusa. Corollæ superior pagina cum stigmatum lacinulis, ad lentem observatæ, punctulis densissimis prominentibus primari deprehenduntur, ataneæ instar cæcis, absque tamen omni pubescentia. Semina biserialia, e majoribus, corrugatis senescentia, cum intimo integumento chalaza insigniori atque umbilico e regione opposita notato.

undulata. *B. M. t.* 144.

antherosa. *B. M. t.* 751.

IRIS.

Inflor. fasciculata. *Cor.* inferius variegata tubulosa; limbus per amplius 6-partitus, lacinias inæqualibus, alternis magis arrectis, perraro evectis suppariter expansis. *Stigma* 3, amplitudine petaloidea, involutum complicata, prædispariliter bilabiata. *Caps.* oblonga, tereti-trigona. *Sem.* numerosa, majuscula, sicco-rare carneso-baccata; in universum complanata varieque presso, vix unquam absolute globosa.

Obs. Genus pro ordine speciebus maxime gravatum, forte etiam nimis atque nimis anomalis. Radix nunc tunicato-bulbosa; nunc ex rhizomatibus perennantibus aggesto-coagmentatis

coagmentatis strues crassa, solido-carnosa prorepenter et quaquaversum producta ; perraro semel tuberosa. Foliatio bifaria, tum plano-ensiformis, tum canaliculata, raro quadrangula. Caulis de subnullo per species tripedalem acquirens altitudinem. Stamina libera, trifariam spectantia, tubo imposita. Capsula coriacea atque ferme cartilagineo-rigescens. Semina biserialia, sæpius lævia, raro tuberculata. In *persica* et *alata*, inflorescentia subuniflora et partim subterranea, pene *Croc*i instar.

Imberbes,

Radice rhizomatosa, crassa, solida, fibras filiformes exserente, prorepente ; foliis plano-ensiformibus.

pseudo-acorus. Eng. Bot. t. 578.

orientalis. Willd. Sp. Pl. 1. 237.

halophila. Pall. It. 3. app. 63. t. B. f. 2.

ochroleuca. B. M. t. 61.

sibirica. B. M. t. 50.

spuria. B. M. t. 58.

virginica. B. M. t. 703.

versicolor. B. M. t. 21.

foetidissima. Eng. Bot. t. 596.

verna. Willd. Sp. Pl. 1. 235.

cristata. B. M. t. 412.

chinensis. B. M. t. 373.

graminea. B. M. t. 681.

ensata. Willd. Sp. Pl. 1. 237.

tenuifolia. Pall. It. 3. app. n. 66. t. C. f. 2.

ventricosa. Id. eod. 3. app. n. 62. t. B. f. 1.

stylosa. Desf. Fl. Atl. 1. tab. 5.

Barbatae.

pumila. B. M. t. 9.

lutescens. Willd. Sp. Pl. 1. 225.

flavissima. Jacq. Ic. rar. 3. t. 220.

- arenaria. *Pl. rar. Hung. t. 57.*
 variegata. *B. M. t. 16.*
 biflora. *Willd. Sp. Pl. 1. 227.*
 aphylla. *Willd. Sp. Pl. 1. 227.*
 plicata. *Lamarck Encyc. 8. 296.*
 Swertii. *Lamarck Encyc. 3. 290.*
 lurida. *B. M. t. 669.*
 sambucina. *B. M. t. 187.*
 bohémica. *Schmidt Fl. Bohem.*
 germanica. *B. M. t. 670.*
 florentina. *B. M. t. 671.*
 pallida. *B. M. t. 685.*
 susiana. *B. M. t. 91.*

Imberbes,

Radice tuberosa ; foliis quadrangulis.

tuberosa. *B. M. t. 531.*

Radice tunicato-bulbosa ; foliis canaliculatis.

Xiphioides. *B. M. t. 687.*

Xiphium. *B. M. t. 686.*

lusitanica. *B. M. t. 679.*

mauritanica. *Nos Clus. cur. post. 24. (juncea Desfont.*

Fl. Atl. t. 4. In Herb. Lambertiano hujus occurrit specimen integerrimum spontaneum.)

juncea. *Willd. Sp. Pl. 1. 235. (Planta Poirati atque Tournefortii, a præcedente distincta satis. Hujus quoque possidet perfectissimum exemplar nativum Dom. Lambert.)*

alata. *Lam. Encyc. 3. 302. Clus. Hist. 210. f. 1.*

scorpioides. *Desf. Fl. Atl. 1. t. 6.*

persica. *B. M. t. 1.*

MARICA.

Inflor. fasciculata. Cor. hexapetaloideo-6-partita, disco glandulose incrassato staminifero. Stigm. 3, stylo longiora, rectissima, turbinatim divergentia ; frequenter imminuto-petaliformia,

petaliformia, complicatim involuta, bilabiata, in compagem inverso-pyramidatam atque alato-triquetram (cujus angulis respondent antheræ, dum in longum equitant) longius breviusve concreta; modo in lacinias gracillimas et subtubulose convolutas, ad apicem hiantes vel breviter fissas bipartita; dum fissuras intercedunt filamenta. *Caps.* oblonga, rotundato-trigona sæpe columnaris, polysperma vertice deglubito.

Obs. Herbæ perennes in America australiori, potissimum ad paludes et fluvios, provenientes. Radix aut tunicatus bulbus aut fibrosum rhizoma, illic folia petiolata et flabellatim plicata, hic ensiformia atque explicata. Corolla involuto-deflorescens, decidua, sæpius fugacissima et per tenera; laciniae intimæ minores cæterorum communiter dissimiles et sæpe maxime difformes. Filamenta antheris breviora non concreta, styli triquetri angulis respondentia; in plurimis antheræ quæ primo liberæ erant, fecundatione absoluta, stigmatum angulos, rore viscido jam madentes, per introversam loculorum conduplicationem equitanter prehendunt ibique perstant; dehinc sustentur filamenta, quando enim admoto acu huncce solvas nexum, illa cerncris succidere detensa. *Caps.* coriacea. Sem. biserialia ex rotundis plurimum angulata. Haud aliunde alterutris proprius character distinguit planifolio-fibrosas a plicato-bulbosis; contra sunt eæ adeo inter se implicatæ atque permixtæ ut profecto nihil ultra deinde sit lucrandum in genere dividendo. Stamina ad facies interangulares stigmatosas adposita illas *Moræas* quæ stigmatibus petaliformibus gaudent a *Maricis* similiter dotatis dimovent.

northiana. *B. M. t.* 654.

martinicensis. *B. M. t.* 416. (IRIS.)

paludosa. *B. M. t.* 646.

plicata. *B. M. t.* 655.

palmifolia. Willd. Sp. Pl. 8. 379. (SISYRINCHIUM.)
striata. B. M. 701.

TIGRIDIA.

Filam. in columellam teretem, cuniculatam, antheris multo longiorem unita. *Stigm.* 3, semipartita, cætera instar *Maricæ*.

OBS. Genus omnimodo arbitrarium nimiumque forte artificiosum; non equidem inutile, dum exinde evadat circumscriptionis *Maricæ* definitio, jam justo prolixior. Bulbus tunicatus, ovatus, fastigiatus. Caulis sæpius ramosus. Folia petiolata, flabellatim plicata. Capsula tereti-trigona, columnariter elongata, subtorulosa, vertice amplius deglubito. Semina numerosa, oblonga, corneodura.

pavonia. B. M. t. 532. (FERRARIA *Tigridia*.)

SISYRINCHIUM.

Nec differt a *Marica* nisi per filamenta connata capsulasque fere rotundas.

OBS. Radix e rhizomate fibrosa. Folia ensiformia nunquam plicata. Corolla semper rotatim explanata, indeque a *Tigridia* distinctum. Stigma quandoque fere simplex.

Bermudiana. B. M. (SISYRINCHIUM *Iridioides*.)

gramineum. B. M.

PARANTHUS.

Infior. fasciculata, bracteis fere divaricate solutis. *Cor.* hexapetaloides-sexpartita, regularis, æqualis, stellato-explanata. *Stems.* recta aliquantulum inclinata, divergentia: antheræ subconflexæ, *Pistil.* his subæquale; *stigm.* 3, involutum et cucullatim complicata, bilabiata, immutato-petaliformia. *Sem.* plurima, biserialia, baccata, globosa, receptaculo centrali, libero, annexa.

OBS. Radix perennis; rhizoma carnosum solidum, seboliferum,

litterum, fibris filiformibus crassiusculis. Folia plurima, glabra. Caulis foliosus, flexuosus, dichotome et paniculate ramosus procerior. Corolla sub deflorescentia magnopere et, artissimis in longum contorquetur, dumque perstet occallescit. Capsula coriacea, obovato-oblonga, rotundato-trigona cujus valvæ tandem revolutionem reflectuntur. Receptaculum triquetrum; semina rotunda, glabra, lævia, per maturitatem nigra atque corrugata, vel tandem subangulosa.

chinensis. B. M. t. 171. (LXIA.)

XVII. Observations on the Rivulariæ and the Genera related to them. From the German* of Dr. ROTH.

WHEN I first published an account of this new genus in my "Catalecta Botanica†," and in "Observations relative to the Study of Cryptogamous Aquatic Plants‡," I was only acquainted with three of its species. However, in the summer of 1800, having an opportunity of repeatedly examining a few more, I acquired a more intimate knowledge of the internal structure of these vegetables.

The first species of this genus that fell under my observation was RIVULARIA *Cornu damæ*: I found it, in company with my friend Professor Mertens, on small pebbles, in a ditch where the spring-water had collected. At first view we took the plant for an *Ulva*, and next, on account of its hardish, nearly cartilaginous structure, for a *Tremella*; but upon a closer examination we were satisfied that it belonged to neither of these genera, nor indeed to any other known genus of submersed algæ; for it consisted merely of

* Roth's Neue Beyträge zur Botanik, vol. i. p. 239.

† ——— Catalecta Botanica, fasc. i. Lipsiæ, 1797, p. 212.

‡ ——— Bemerkungen über das Studium der Cryptogamischen Wassergewächse, Hannover, 1797, pag. 55.

a gelatinous transparent substance, without any membranaceous covering. Not being provided at that time with a compound microscope, we were unable to discover any thing in the substance but dark branched lines, which we took for the organs of fructification. To this want of a good microscope it was likewise owing that we overlooked the hair-like threads I afterwards discovered on the outer surface of this plant.

The following day we found in a small ditch in a meadow, likewise on pebbles, a second species, *RIVULARIA confervoides**. This, in regard to structure and substance, agreed with the former; but it was much smaller, more delicate in all its parts, and its surface beset with very thin, transparent, geniculated, and branchy threads.

Two years after, being on a botanical tour with the Rev. Mr. Trentepohl, I found, at the borders of an extensive lake in the duchy of Oldenburg, a third species, *RIVULARIA endiviæfolia*†, on withered sprigs and roots. It very much approached to *Rivularia confervoides*, from which it was, however, sufficiently distinct by its outward appearance and internal structure.

In the summer of 1801 I found this latter species very frequently, and in different stages, on the stalks and leaves of *Myriophyllum verticillatum* in a ditch of a meadow, and intermixt with it several round globules of a green colour, which at first view I took for *Tremella verrucosa* in a juvenile state; a more exact examination, however, that proved them to be without a membranous covering, occasioned me to give up this idea, especially as, except in their round shape, they very much agreed with the *Rivulariæ*. At the same time I discovered, in the transparent substance, articulated threads which I had not yet seen so distinctly in the other species; a circumstance that induced me to subject

* *Tentamen Floræ Germanicæ*, l. c. p. 545.

† *Ibid.* p. 546.

them to another examination with a better microscope, which, except some slight deviations, afforded the same results as before.

Before introducing the reader to the more intimate knowledge of the different species, I shall give some general remarks which may throw additional light on this new vegetable genus, and serve the naturalist as a basis for future observations.

1. All the species of this genus known to me grow in clear fresh water, fixed to bodies of different kinds; I have no doubt, however, that other species may be hereafter discovered in salt water, as is the case with several genera of the submersed algæ.

2. In common with other submersed algæ, when soaked in water, after being kept in a dry state even for several years, they adopt an appearance perfectly like that when alive.

3. With regard to their external form, they are either branchy (*frondosæ*), or round and undivided (*globulosæ*): they are composed of a gelatinous, colourless, uniform, and extremely transparent substance, which, according to some unknown laws, preserves its form without the assistance of any membranaceous integument: hence, in common with all other gelatines that have no such covering as the Tremellæ, not the smallest vestige is left when they are pierced through with a needle. Their substance is of different consistence at different periods of their growth: in the younger plant it is rather hard, almost cartilaginous, and less transparent; but as it advances in age, and when its constituent parts approach towards dissolution, it becomes thin and very transparent. At this latter period the eye discovers dispersed in this delicate jelly (which, in some species, is easily divisible into irregular flakes) nothing but short and articulated lines (being the extremities and remains of the fructiferous filaments), or else single grains. In this state
the

the Rivulariæ are distinguishable from the nearly related species of *Linckia*, merely by the want of a membranous covering. The period of their life, from their first development to their dissolution, does not appear to extend beyond the limits of a year.

4. The external surface of most Rivulariæ is smooth, glossy, and so very slippery that under water they cannot be held between the fingers: if placed in a fresh state on glass or paper under the surface of water, they run off immediately with the water when taken out.

5. The colour of the Rivulariæ hitherto known is green, and seems merely to proceed from the filaments contained in their substance. It is in exact proportion with the different periods of their lives: in the younger state of the plant, when the filaments are not yet sufficiently developed and lie close together, it is dark green, but becomes lighter and lighter the more these approach to perfection, so that in its most advanced stage of growth it appears completely pale. If these plants are suffered for several days to remain in a vessel filled with water, they likewise turn paler, exchanging their beautiful green colour for a dirty white or yellow.

6. Through the whole substance of the Rivulariæ, there are dispersed articulated, simple, or branched filaments (*filamenta fructificantia, sporangia* Hedw.) which appear to take their origin from the part where the plant is fixed to its situation, and perfectly resemble the filaments of the articulated confervæ. They are developed through the whole extent of the plant, regularly with the gelatinous substance that surrounds them, never being prolonged beyond its surface; whence, on reaching the latter, they appear as it were truncated. In the younger state of the plant, from the base to the utmost extremities, they are dark green and opaque; which makes the transparency of the whole plant at this period rather less: as they approach their

their perfect growth, they begin from below to lose their colour, and at last become so clear and transparent as to be scarcely distinguishable from the substance containing them : the uppermost and extreme branches, however, remain dark-coloured and for the greatest part opaque.—Hence it is that, when arrived at a state of perfection, a moderate magnifier discovers nothing within the substance of the Rivulariæ, but dispersed, opaque, short, and variously curved lines, which, on substituting a higher power, and on properly managing the light and shade, will easily be found to be the extremities of the branches of the filaments, the greatest part of which has become perfectly transparent. At this period, too, the larger stems of the branched filament at the base of the vegetable, are perfectly dissolved, so that the highest magnifying power cannot discover any traces of them. To a similar change the filaments are subject when the plant is kept in a vessel of water without being in contact with the external air.

7. The joints (*articuli*) of these filaments are different according to the different periods of the plant, both in regard to their form and transparency. In the nearly adult plants, those at the stem and larger branches are longer, as transparent as the surrounding substance, and perfectly empty ; those at the extreme branchlets, on the contrary, are very short, generally transparent, and in most species filled with grains. Hence, in this period of the plant, they are more perceptible at the extreme than at the lower branches and at those of the stem. The annulated knots (*genicula*) that separate the joints appear as very fine lines (*genicula annularia, linearia, tenuissima*) ; they form no septa that close the canal of the filaments at the extremities of the joints (*genicula dissepimentosa*), but appear to take their origin from a change in the direction of the fibres. In the branched species (*Rivulariæ frondosæ*) they are generally

rally more transparent than the joints ; in the globular ones, on the contrary, they are more or less opaque.

8. In several species, at the period of their perfection, when the substance appears paler and more transparent, the joints of the extreme branches of the filaments often separate at the annular projections, and appear lodged in the substance as single dispersed grains. This remarkable separation, which gradually shortens the extreme branches, explains why, in the state of the greatest perfection of the plant, none of those truncated branchlets are observed near the surface, that were obvious at an earlier period.

9. It is not improbable to me, that the filaments in the gelatinous substance of these vegetables form capillary tubes, in which, during the younger state of the plant, the grains of fructification are generated ; these as they approach maturity are gradually conveyed towards the extreme points of the branchlets, till, when perfectly ripe, they either burst forth, or fall off together with the joints containing them.

10. In all the individuals of this genus that I had an opportunity of observing in a living state, there appear, when viewed under a good microscope, a number of very delicate and transparent, branchy, articulated, capillary threads, issuing from the surface of the gelatinous substance. In the younger state of the plant they are more numerous and stronger, at a later period more delicate and decreasing in number. The structure of their joints and rings being totally different from that of the filaments within the substance, they cannot properly be considered as the prolonged extremities of these organs. They appear as delicate capillary tubes, that either convey nourishment to the plant from the water, or perhaps are instrumental to the performance of the sexual functions. If the latter is the case (and indeed there is scarcely any thing against this supposition),

tion), they are probably vessels in and by which the male seminal fluid is secreted, and conveyed to the germs in the filaments of the substance; hence real spermatic vessels (*Spermatocystidia* Hedwig.). At an advanced state of maturity of the plant they totally disappear; which happens also when the plant is kept excluded from the air in a vessel filled with water. In all cases where I soaked dry specimens of this genus in a coloured fluid, these hair-like threads, which took only a faint tincture of the colour, instantly parted with it when the plant thus prepared was committed to pure water. If they really be *Spermatocystidia*, this phenomenon may be easily accounted for by the oily nature of the male spermatic fluid not admitting of any mixture with a watery fluid.

11. In the full grown plants, especially the frondose species (which indeed have a less transparent and delicate substance than the globular ones), a lens will discover only the last extremities of the filaments near the outer surface of the substance, while the filaments of the stem and greater branches, on account of their transparency, will remain invisible: but with a good compound microscope, if the subject be placed in the most advantageous point of view, the very transparent articulated branches will appear with sufficient distinctness. Before I made this discovery I suspected the substance of these *Rivulariæ* to be hollow, and the filaments to take their origin near the outer surface of the substance. In order to satisfy myself about this I made the following experiments: first I cut several transversal sections both of the stem and branches of *Rivularia Cornu Damæ*, and, bringing them under the microscope, observed them completely solid, without the least hollow or opening. Secondly, I soaked several specimens of the same *Rivularia* and *R. endiviæfolia*, that had before been dried upon glass and paper, in a saturated decoction of *Brasil-wood*, with the addition of some alkali; and on exposing

posing them to the microscope discovered a uniformly coloured solid substance, that clearly displayed a number of filaments unaffected by the colour. The Rev. Mr. Trentepohl, a very accurate and acute observer, to whom I communicated my observations on these vegetables, has indeed since discovered some species of the branched Rivulariæ, and a globular one in which a cavity is observable; these are easily known, even on first sight, by floating on the surface of water when detached from their station, while the others sink to the bottom. I shall hereafter observe further on these.

12. The different species of Rivularia, when received on glass or paper, dry very slowly, and completely retain their original shape; when quite dried they appear as a thin transparent mucilaginous membrane, in which the filaments are almost as clearly observable as in a fresh state: the threads on the surface acquire greater solidity when dry, and hence become more distinct than before.

13. On account of their gelatinous substance, the branched Rivulariæ were classed with the Tremellæ by Dillenius*, as were afterwards the globular ones by Hedwig†. The latter author, however, allows his Tremella globulosa‡ to be distinct from T. granulata§, and to have nothing in common with the true Tremellæ, except the roundish shape: it is therefore difficult to conceive how such an accurate and systematical observer could choose this plant for demonstrating the parts of fructification of the Tremellæ. This Trem. globosa of Hedwig, as I now see from his description and excellent figure||, certainly belongs to the

* Dilleni Historia musc. p. 51.

† Hedwig. Theoria generat. et fruct. ed. 2. p. 214. 220.

‡ Hedwig. l. c. p. 217. "Diversissima est a Tremella granulata, neque præter habitum quidpiam commune habet cum Tremellis geminis."

§ Roth Tentam. Fl. Germ. tom. iii. pars 1. p. 566. *Uva granulata* Linn. Sp. Pl. ed. Reich. tom. iv. p. 586.

|| Hedw. Theoria generationis, l. c. tab. 36.

Rivulariæ. Tremella globulosa and natans Hedw.* cannot on any account remain with the Tremellæ, with which, as I was then unacquainted with Hedwig's work, I have classed them in my *Flora Germanica* (vol. iii. pars 1. p. 551.): they belong to the second division (*globosæ*) of Rivularia, as the Tremella palmata described and figured by the younger Prof. Hedwig, in his dissertation on Nostoc†, should be referred to the first division (*frondosæ*). Being acquainted with the latter dissertation only through a review in Schrader's Journal, I cannot decide whether this T. palmata belongs to my Rivularia endiviæfolia.—From all this it will appear that the generic character I have given of Tremella in another place‡, is not rendered less accurate by the observations of Hedwig, as was supposed by this great naturalist§. In the Tremellæ the watery or gelatinous substance is surrounded by a membranous covering, to which they owe their shape, and their internal structure is remarkably simple: what sometimes appears like striæ in the young specimens of some species, are no real filaments, but owe their existence to optical deception, to the rays of light reflected by the grains of fructification. In the Rivulariæ, on the other hand, the shape peculiar to each species is preserved by the cohesion of the substance alone, without the help of any membranous covering; and within the substance are contained the above described filaments, which, in their different stages, are so well represented by Hedwig in the figure of his Tremella globosa||.

Having premised these general remarks, I shall now

* Hedw. Theoria generationis, p. 217, 218.

† Tremella Nostoc; commentatio, quam ad summos in arte medica honores competendos publice defendet R. A. Hedwig. Lipsiæ, 1798, c. t. 22. ii. 4to.

‡ Roth über das studium der kryptogamischen wasser-gewächse, p. 60.

§ Hedwig Theoria generat. ed. 2. p. 216.

|| Ibid. tab. 96. fig. 3. 6.

proceed to an examination of all the species of this genus that are known to me.

RIVULARIA.

Substantia gelatinoso-cartilaginea hyalina, integumento membranaceo destituta. Fructificationes in filamentis geniculatis intra substantiam nidulantibus.

* *Frondosæ.*

1. RIVULARIA *Cornu damæ.*

R. frondibus teretiusculis ramosis papillosis solidis: ramis divaricatis; ramulis abbreviatis: filamentis intra substantiam laxè ramosis; ramulis moniliformibus divaricatis.

R. *Cornu damæ* Roth. Fl. Germ. vol. iii. pars 1. p. 544.

The capillary threads on the surface, few, of a very delicate and articulate structure, may best be observed in specimens dried on glass.—The filaments, extending through the whole substance of the plant, are articulated, very transparent, forked, branchy: their branchlets spreading and often bent backwards, moniliform, generally opaque: annular knots very transparent, the joints of the chief stem and branches oblong and transparent, those of the branchlets almost round, quite opaque, and filled with brownish grains of fructification.

2. RIVULARIA *confervoides.*

R. frondibus linearibus compressis ramosis divaricatis solidis: filamentis intra substantiam tenuissimis laxè ramosis, ramulis rectis sparsis.

R. *confervoides* Roth Fl. Germ. vol. iii. pars 1. p. 545.

The articulated capillary threads are short, and thinly scattered on the surface, and distinguishable both in the fresh and dry state of the plant.—Filaments, diffused through the whole substance, more delicate than in the other species, and, except in the extreme branchlets, so very transparent that the annular knots are scarcely distinguishable

guishable from the joints ; branches spreading ; branchlets straight and sparse ; annular knots transparent, scarcely projecting ; joints partly transparent, partly filled with opaque grains, whence, at first view, the substance at the margin appears granulated.

3. RIVULARIA *endiviæfolia*.

R. fronde suborbiculata, planiuscula, lacunosa, palmato-multifida, solida ; ramulis truncatis teretiusculis ; filamentis intra substantiam ramosissimis ; ramulis fastigiatis, rectis, dichotomis, apice obtusissimis incrassatis.

R. *endiviæfolia* Roth Fl. Germ. vol. iii. pars 1. p. 546.

This species, at its first development, shows a roundish, dark green, opaque grain, of the size of a poppy seed, from which issues a short, truncated, opaque, dark green branch, which is either simple or split at the top, and (as well as the grain at its base) beset with long strong capillary threads of a crystalline transparency. As the plant advances in age, it is widened out at its base into a nearly orbicular, transparent, greenish pelta, from the borders of which issue several round, truncated, and palmate branches. At this stage the threads at the surface are shorter, and at the expanded base almost completely vanished.—The filaments are spread through the whole substance of the vegetable in straight lines, much branched and articulated. The branches, which are nearly horizontal, are at all sides directed towards the surface, and subdivided into straight, dichotomous branchlets, still tending towards the surface ; they are nearly of equal length, in a younger state of the plant pointed and of a dark green colour, at a more advanced age of a lively green, and very blunt. The annular knots are transparent ; the joints unequal, some cylindrical and transparent, others (particularly at the outer branches) short, scarcely of double the length of the annular knots, opaque, and containing each a grain.

OBS. This species shows more distinctly than any other, that the terminal joints, filled with grains, separate, at the time of the maturity of their contents, from the next joint, when the scattered grains are lodged in the gelatinous substance of the plant.

4. *RIVULARIA Linckia.*

R. frondibus tubulosis, inferne rectiusculis, superne dilatatis ramosis, sinuatis : filis intra substantiam simplicibus intricatis, serpentiformi-crispatis, submoniliformibus.

As I have not yet had an opportunity of observing this vegetable alive, I still doubt whether it belong to this or the next genus *Linckia*. I received dry specimens, and an accurate description of it, from the Rev. Mr. Trentepohl, who had found it in the ditches of the duchy of Oldenburg.

The tubular folliculi of this species, the largest hitherto known, are fixed, by means of their base, to *Conservæ* and other aquatic plants ; they are straight under water, and float when they reach the surface ; of a gelatinous, very slippery, hardish substance, round, thin, and straight at the lower part, and from 3—8 lines in diameter, and expand upwards into branches. They vary in size, from half an inch to a foot. Their colour is between a yellowish green and brown or dark brown. The single branches are few in number, simple, sinuate, wrinkled, mesenteriform, almost compressed, and much thicker than the stem or principal utriculus.

The filaments, forming a close texture, are articulated, nearly moniliform, variously curved and wrinkled ; they are dispersed through the whole substance of the utriculus, but still in some parts more crowded than in others. The annular knots are contracted ; but the joints for the most part globular, the terminating joint often larger than the rest.

In

- In drying, this vegetable acquires a violet brown colour, adheres strongly to the paper, and is not easily restored to its former state by soaking.—There is a variety with simple tubes, that is thick, blunt, and almost club-shaped above.

OBS. 1. This plant in its younger state (especially the variety with simple tubes) bears great resemblance to *ULVA lubrica* (Catalecta Bot. fasc. 1. p. 204. Fl. Germ. tom. iii. pars 1. p. 340.); but is distinguishable from it by its greater solidity, darker colour, and chiefly by the presence of filaments. In *Ulva lubrica* the grains are distributed in regular squares, as was observed last summer by the accurate Mr. Trentepohl.

OBS. 2. The filaments of this plant perfectly resemble those of the genus *Liackia* figured by Micheli, Nov. Gen. Plant. tab. 67. fig. 2. A.

OBS. 3. The tubes, on being detached from the place to which they were fixed, swim, like *CONFERVA intestinalis* Roth (Fl. Germ. t. iii. pars 1. p. 434.), on the surface of the water, and when grown older are marked with several longitudinal fissures. In this state the plant appears in the shape of a gelatinous membrane, with margins rolled backwards.

OBS. 4. When very old, this species appears as a thin pale brown and rather violet-coloured gelatine, in which only a few short, straggling, distorted filaments are still observable.

**** Globulosæ.**

5. RIVULARIA elegans.

R. globosa, solida, filamentis intra substantiam vagis dichotomis; ramis divaricatis; ramulis fastigiatis secundis; geniculis obscuris; articulis cylindraceis.

This handsome vegetable I observed towards the end of last summer on the decayed leaves and stalks of *Myriophyllum verticillatum*, in a ditch filled with sweet stagnant

water. The globules, of various colour, size, and consistence, were mostly solitary, but rather close together. The point to which they were attached was not distinctly discernible.

The young globules are dark green, perfectly globular, opaque, hard, and almost cartilaginous, glossy under the magnifying glass, rather uneven at their surface, but not surrounded by any membranaceous covering: their usual size is from that of a mustard to a hemp seed. In a more advanced state they often attain the size of a pea, are of a pale green colour, softer, gelatinous, more transparent; they follow each movement of the water, are easily disengaged from the point to which they are fixed, and in this case often change their globular form for an irregularly round one. Having attained the highest degree of maturity they become of a yellow green colour, and perfectly transparent; and when in this state, if disengaged from their station, they appear like swimming flakes, but without any real change in their form and gelatinous quality. In all their stages these globules, when viewed on a piece of glass, have the appearance of a convex jelly, perfectly resembling a young Tremella: but on examining them more closely through a good lens, the eye is struck by the diversity it discovers both in their external and internal structure.

In this species, both when young and old, the threads issuing from the surface are easily observable, especially in the shade; they are about half a line long, straight, very tender, completely transparent, branchy, forked, and articulated. The fruit-bearing filaments within the jelly are more obvious in this species than in the others; they are very tender and articulated; the stem and larger branches very transparent, and only distinguishable from the substance when highly magnified in the shade; the smaller ramifications are of a beautiful green. . . . Branches spreading and often bent back

back under an obtuse angle: branchlets equal in length, mostly turned towards one side, short, blunt, and close together, in the younger state of the plant crowded and rather wrinkled. The annular knots are delicate, equal in width, and opaque; the joints cylindrical, double the length of the diameter, and transparent, but in the smaller ramifications only transparent in the middle, and dark green at both extremities;

6. *RIVULARIA pisiformis*.

R. globosa solida, filamentis intra substantiam rectis, torulosis, geniculatis, a basi ramosis, concentricis; ramis ramulisque alternis remotis; geniculis tenuissimis contractis; articulis ovalibus.

My friend Mertens first discovered this species on the stalks of *Hydrocharis Morsus ranae*, in the fen near Lesum. In shape, colour, size, and consistence, it completely resembles the foregoing species, from which it differs, however, in its internal structure, and the direction of the fructiferous filaments. These are extremely delicate, diverge from the centre, where they are closely arranged, in rays towards the surface in all directions; are articulated, uncommonly transparent, branchy, forked, and gibbous. Their ramifications, alternate and distant, form acute angles: the smaller branches are simple, long, slender at the top. The annular knots of equal width, slender, opaque, and rather contracted. The joints are nearly oval and transparent.

7. *RIVULARIA dura*.

R. globosa, solida, dura, filamentis intra substantiam rectis subtorulosis geniculatis concentricis, inferne simplicibus, superne dichotomis; ramis parallelis adpressis sequilibus fastigiatis; geniculis subcontractis; articulis ovalibus.

TREMELLA globulosa sphaerica, sparsa, superficie plana, amoene viridis. Roth Fl. Germ. tom. iii. pars 1. p. 551. (excluso synonymo Hedwigii.)

This species I found some years ago in company with the Rev. Mr. Trentepohl at the borders of the Zwischenahner lake: we took it for *ULVA Pisum* Linn. Syst. Pl. ed. Reich. tom. iv. p. 586., or *CONFERRA Pisum* Fl. Dan. tab. 660. fig. 2., but had then no opportunity of subjecting its internal structure to an accurate examination. This was the cause of the mistake with regard to *Tremella globosa* in my *Flora Germanica*; an error which I am now enabled to correct, as Mr. Trentepohl has communicated to me his observations, made with his wonted accuracy on fresh specimens of this species.

The globules are found either solitary or in crowds on withered sprigs or other vegetable bodies; they are very nearly globular, generally of the size of a hemp seed, and consist of a solid and almost cartilaginous jelly, that resists the impression of the nail, or the point of a knife.—The filaments, as in the foregoing species, diverge from the centre in close array towards the surface; are articulated, gibbous, generally straight, but sometimes flexuose, simple towards the base, above or towards the surface of the globe di- or trichotomous. The branches are of equal length, and straight, and so close together that scarcely any intermediate space is perceptible; the branchlets all truncated at an equal distance from the surface. The annular knots are rather contracted; the joints oval, transparent, and double the length of the diameter. The grains of the filaments are perfectly globular, transparent, very shining, and not in any great number.

It does not shrink by drying, like the others, but preserves its globular shape and pale green colour.

OBS. 1. This species is distinguishable enough from *Rivularia pisiformis*, 1. by its hardness; 2. by its filaments being

being simple and without divisions below, and forked above, while those of the foregoing species are alternately branched from their very base; 3. by the direction of the branchlets, which are of equal height and very close to each other.

OBS. 2. Though this species agrees in most respects with *TREMELLA globulosa* Hedwig. (*Theor. Gener. ed. 2. p. 217.*), yet I rather doubt its being the same plant, as in the drawing (plate 36. fig. 5 and 6.) the joints of the filaments are represented as cylindrical, and of the same diameter with the articulated knots: in our species the former are oval, the latter rather contracted.—*CONFERRA Pisum* (Fl. Dan. tab. 660. f. 2.) can perhaps still less be considered as the same with our species, because the filaments represented are simple, and the joints likewise of the same diameter with the annular knots.

β. utriculata filamentis intra substantiam crassitie æqualibus.

TREMELLA globulosa exigua sphærica, amœne viridis, partibus fructiferis ramosissimis articulatis. *Hedw. Theor. Gener. ed. 2. p. 217. tab. 36. f. 1—6.*

TREMELLA verrucosa subrotunda, utriculosa, superficie rotunde lobata, fusco-viridis, *Roth Fl. Germ. tom. iii. pars 1. p. 554. (excluso saltem synonymo Michellii.)*

Professor Mertens first observed this plant, together with *Linckia pruniformis* (*Ulva pruniformis* L.), between Bremen and Gröpelingen. It is of a dirty or yellowish brown colour, cartilaginous, and grows in crowds on rotten sprigs and culms of the larger species of grasses. Its size is from that of a white mustard seed to that of a walnut. The smaller or younger plants (such as Hedwig, as cited above, has figured them) are round, dense, opaque, and of an even surface. The larger and more advanced specimens are sinuate, uneven, gibbous, variously contracted, and appear to be composed of several vesicles. In this state they are also

generally found hollow, torn, and full of holes, which may be owing either to advanced age or the devastation of aquatic insects: they then appear to form a coriaceous membrane; but on a closer examination it will be found, that their nature is different, since when pierced with a needle not the least trace of the puncture remains. The whole substance, both in a young and old state of the plant, is closely filled with articulated, forky-branched filaments, that resemble very much those of *Tremella globulosa*, so well figured by Hedwig in the abovementioned work, fig. 3—6.

Obs. It is difficult to decide whether our plant be the same with *Tremella verrucosa* or *utriculosa* of modern botanical authors, as none of them make particular mention of their sexual parts; and some describe them as being solid, others as hollow; a difference, perhaps, to be accounted for by the different periods of growth at which the observations were made, as well as from other accidental causes.—*Linckia palustris gelatinosa, saxis adnascens, ex obscure fulva et concava, vesicam referens*, Michel. Nov. Gen. Pl. p. 126. f. 2., cannot certainly belong to our plant, on account of the totally different nature of its organs.

8. *RIVULARIA rugosa*.

R. orbicularis, convexa, rugosa, solida, filamentis intra substantiam concentricis superne ramosis: ramis ramulisque sparsis remotis subparallelis; summis fasciculatis: geniculis contractis.

This plant, discovered by Mr. Trentepohl on withered vegetable parts in ditches near Hude in the duchy of Oldenburg, forms round disks, is undivided, solid, cartilaginously gelatinous, of a light green colour, almost pellucid; the upper surface convex, rather wrinkled, shining; lower surface concave; diameter at most one inch, thickness two lines.

The

The filaments that issue radiated from the centre are articulated, simple below, branched from the middle upwards, and sometimes furcated. Branches and branchlets straight, nearly adpressed to the stem; lower ones scattered and remote; the upper fasciculated and short.—The annular knots are contracted.—The joints transparent, the shorter ones nearly globular, the longer almost cylindrical and sometimes of double the length of their diameter.—The grains of fructification are globular, very transparent in the centre; they lie remote from each other within the filaments, and at last collect at the annular knots,—By drying, this species becomes flat.

9. *RIVULARIA verrucosa*.

R. hemisphærica, verrucosa, solida, atroviridis, filis intra substantiam simplicibus, intricatis, crispatis, geniculatis.

Mr. Trentepohl found this species abundantly on *Hydrodictyon majus* (Catal. Bot. fasc. 2. p. 238.), in ditches near Strückhausen in the duchy of Oldenburg. It is cartilaginously gelatinous, hardish to the touch, commonly of a dark, sometimes of a light green; size from that of a poppy seed to a pea: but there were also found some very minute ones, scarcely of the apparent size of a poppy seed when seen through a lens. In its younger state this plant is almost globular, but as it advances in age the lower surface becomes flat, the upper convex and warty: after this it appears quite flat, and in its last state completely amorphous, lacerated, lobed, and often bored with holes in the centre so as to resemble a net.—The simple articulated filaments within the substance are closely twisted together, bent and curled. Annular knots are scarcely contracted. The joints transparent, short, and of the same length with their diameter.

10. RIVULARIA *angulosa*.

R. globoso-angulosa, cava, viridi-lutescens, filis intra substantiam simplicibus, subulatis, strictissimis, geniculatis : articulo primario globoso, hyalino.

TREMELLA natans varia sordide viridis, partibus frugiferis simplicibus subulatis, globulis pellucidissimis insidentibus. *Hedw. Theor. Gen. ed. 2. p. 218. tab. 36. f. 7. 10.?* *Roth Flora Germ. tom. iii. pars 1. p. 551.?*

This species, which was found by the same gentleman on *Confervæ* and other aquatic plants in the ditches of Oldenbrook in the duchy of Oldenburg, swims on the water as soon as separated from its station.—The globules are crowded; diameter from 2—6 lines, sometimes an inch; they are hollow, but their cartilagineo-gelatinous substance being pretty thick, the cavity is very small. In their younger state they are almost globular, of a dark green colour, and with a smooth surface: as they grow older they increase in thickness, become obsoletely angular, and their colour turns into a yellowish green.

The articulated filaments all issue from the centre, and spread in straight lines and in all directions through the substance; they are simple, subulate, rather thicker below towards the centre of the globule, gradually thinner towards the top, where they terminate in a long point: sometimes they are bent and trailing. The annular knots are very tender, but little contracted in their fresh state, and scarcely discernible; in a dry state the contraction is more considerable. The joints are cylindrical, short, and of the same length with their diameter: the lowermost is globular, very clear and transparent. During the younger state of the filaments all their joints are transparent; but when older the lowermost and thickest are furnished with dark parallel lines, among which the single grains are situated.

OBS. This agrees in all its parts with *Tremella natans* of Hedwig;

Hedwig; and I should not have hesitated to consider it as the same, but for the filaments in his delineation (l. c. tab. 36. fig. 9, 10.) being represented as without any articulations. It is not probable that this exact observer, furnished with the best microscopes, should have overlooked the annular knots; and in this case Hedwig's plant is obviously distinct from ours.

11. RIVULARIA *tuberculosa*.

R. orbicularis, depressa, tuberculosa, cava, filamentis intra substantiam in orbiculos multos distributis a centro dichotomis ramosissimis: ramis ramulisque approximatis patulis sparsis; summis fasciculatis.

Found on stones in the brooks of Meinberg by Mr. Trentepohl. It forms crust-like cartilaginously gelatinous disks, of a pale green or whitish colour. They adhere closely to the stones, which they occupy in crowds; their diameter is from half an inch to an inch, their thickness at most three lines. Their surface is covered with an aggregation of knobs that are globular or compressed, hollow, and of the size from that of a mustard seed to a pea.

The articulated filaments issue from different points, are all over branched and furcated: branches spreading: branchlets alternate, sparse, the lower ones remote, the uppermost, nearest to the periphery of the plant, fasciculated and crowded. The annular knots contracted, nearly opaque: joints transparent and clear, most of them nearly globular, some oval, their length exceeding their diameter by one half.—When dried the plant is marked with fissures, and is rent into several detached parts. It closely adheres to glass or paper.

Obs. The filaments within the substance form as it were several minute roundish disks, from the centres of which issue others. They are placed so close together that they
are

are confused, and only manifest themselves by their different centres or disks.

The articulated filaments within their substance show that the Rivulariæ are nearly related to the Conserveæ: but they approach the Tremellæ nearest; from which, however, as I have already shown, they are distinct, both in their internal structure and from the absence of a membranous covering.

In those cryptogamous aquatic plants that consist of a jelly enclosed in a membrane, and have therefore been hitherto classed with the Tremellæ, we observe a considerable difference in the situation and nature of their respective grains. On finding a gelatinous plant thus surrounded by a membrane, attention is to be paid both to this covering and the inner substance: first, a particle of the former is to be separated with a sharp knife, and brought by means of a drop of water on the glass slider of a compound microscope, when, through the thin transparent membrane, there will either appear curved moniliform lines composed of several globules, or a thick fibrous texture with single roundish grains, dispersed without order. The crooked lines observed in the first case are not lodged, as they appear to be, in the transparent membrane itself, but in those particles of the substance that are still adhering to it. A quantity of the inner jelly, without any adhering membrane, placed on the glass slider of a microscope, will either display the abovementioned moniliform lines in closer array, or nothing but a substance similar to the clearest water, without any grains or traces of organical structure.

If on examining these vegetables we pay attention to the external form only, not to the different situation and nature of their sexual organs, they might, indeed, remain united under one and the same genus; but according to the principles

eiples of the Linnæan system, now almost universally adopted for the examination and arranging of plants, the diversity in the situation and nature of the parts of fructification affords the safest characters for the determination of the artificial genera. It is only by the application of this principle to the cryptogamous class, that such considerable progress has of late been made towards a more accurate knowledge of these vegetables. I am therefore not apprehensive of being suspected of a fondness for giving new names, if I separate these vegetables according to the difference in their internal structure into two distinct genera.

By the older botanical authors, all vegetables that, in their fresh state, resembled a jelly, and showed a trembling motion when touched, were denominated *Tremellæ*.—Micheli has hitherto been the only botanist who has separated such as have grains of fructification disposed within the substance in crooked lines; of these he constituted the genus *LINCKIA*. He has very accurately delineated the fructification of this genus in his *Nova Genera Plantarum*, tab. 67. fig. 4.: where he says, (p. 126.) “*Linckia est plantæ genus inter Agaricum et Ceratospermum, a quibus differt ob seminum dispositionem atque situm, quæ in tortuosam nodosamque lineam, coralli aut margaritarum monilium instar, disponuntur.*”—Wichers (in his *Primitiæ Floræ Holsatiæ*, p. 94.) adopted this genus from Micheli, but derived its character merely from its roundish form.—I shall give the description of those *Linckia* that have fallen under my observation, previously making some general remarks respecting this genus.

1. In their younger state they are generally roundish, with an even surface. Some of them retain this smoothness in a more advanced state, while others then become uneven, wrinkled, or gibbous; but in every condition their substance is surrounded by an extremely thin, transparent,
and

and elastic membrane, by which they are distinguished at first sight from the Rivulariæ.

2. The surrounding cuticle is easily discovered by means of the point of a needle or a knife, which it resists with elasticity, and when pierced the aperture is clearly perceptible. It perfectly resembles the inner substance in point of transparency, and the microscope discovers no traces of a fibrous or organic texture. The peculiar form of the different species is owing to this cuticle.

3. The inner substance of the Linckia is clear and transparent, gelatinous, and crowded with grains. In the younger state of the plant it is more solid; but afterwards becomes softer; and in its adult state, when the grains have attained perfect maturity, the inner substance is dissolved, together with the cuticle, into a thin mucilage, in which the microscope still discovers the grains unaltered.— In the globular species the inner substance is found in larger quantity, and more easily discernible than in the foliaceous and wrinkled species: but in these last, while still young, the substance is considerable, solid, and rather hard, and they then perfectly resemble the spurious Tremellæ: at a more advanced state, when the whole plant is expanded into a membranaceous wrinkled body, the delicate transparent cuticles that form the two surfaces lie closer together, including but a small quantity of gelatinous substance.

4. The darker or lighter colour of these vegetables depends as little on the outer cuticle as on the inner substance, for both are colourless and very clear: it originates merely from the less or greater density of the grains, which varies according to their different stages.

5. The grains of fructification within the substance are generally round, transparent, and clear. They do not originate, as in the Rivulariæ, in articulated threads, but are naked, and disposed in simple lines variously curved, and
4 perfectly

perfectly resembling a row of beads. In a more mature state the grains are almost all of equal size; in the younger state, however, there are seen at certain distances in the line single grains of double the size of others. These lines of fruit grains lie disengaged and dispersed in the gelatinous substance, without having a common point of attachment: they are so very much entangled that it is impossible for the observer to ascertain their beginning and end. The connexion of the grains that form these curved lines is so very slight that, when mature, the least shaking will derange and disperse them, as represented in the figure of Micheli above quoted. These lines of fruit grains are clearly to be distinguished even in the young state of the plant.

6. Except the lines of fructification, I could not discover any trace of a cellular or fibrous texture in any of the species I examined.

These observations will enable the student to distinguish this genus from that of its near relative *Rivularia*: if, however, he should overlook the presence of the cuticle that surrounds the jelly, and hence run the risk of confounding them with those *Rivulariæ* that are furnished with simple filaments, the following observations will guide him in the examination of the sexual parts:—In the *Rivulariæ* a sufficient magnifying power shows that the filaments, which permigrate the whole substance in regular order, are completely articulated; the annular knots between the joints can be distinctly seen in all the species; and when these filaments, arrived at maturity, have by degrees discharged their grains, they still generally remain visible in the substance until the complete dissolution of the vegetable. In the *Linckia*, on the other hand, which are wholly destitute of filaments, the abovementioned lines are disposed singly and irregularly twisted in the gelatinous substance; resembling, indeed, by the connected grains, the articulated filaments;

filaments : but on a closer examination it will be found that these grains are but very slightly connected with each other, and that, when displaced, the highest magnifying power will not discover any vestiges of prior connexion.

LINCKIA

Michel. Nov. Gen. Plant. p. 126. t. 67. A.

Substantia gelatinosa hyalina integumento membranaceo hyalino induta, farcta fructificationum granulis in lineas curvatas moniliformes ordinatis.

* *Globosæ, superficie æqua.*

1. LINCKIA *granulata*.

L. sphaerica, aggregata, nigra, superficie æqua micante, demum glauca.

This species, which in regard to form and size resembles *Tremella granulata* (*Fl. Germ. tom. iii. pars 1. p. 552.*) or *Ulva granulata* Linn., I first discovered last summer on rich moist mould in the flower-pots of my greenhouse, and towards autumn, in wet weather, frequently on pots in open air.

At its first evolution, this vegetable appears on the surface of the earth like black roundish spots of different sizes, and completely resembling some species of *Byssus* ; after some days these spots become rather elevated, and the microscope discovers the young plants in the shape of oblong-ovate, transparent, crystal-like points that expand by degrees, and at last acquire a globular form.

The globules are not furnished with any obvious targeted base (*basis scutata*) ; but their lower part, which is rather narrower, appears as it were depressed into the mould.— They are either found separate and dispersed, or, what is more common, in crowds of the size of poppy or mustard seed, seldom of that of hemp : they are of a black or deep green colour, opaque, with a smooth and very glossy surface, formed by a thin elastic cuticle, resisting the point

a needle, and enclosing the jelly with its fructification. When arrived at its most perfect state, or when the grains are mature, the surface entirely loses its gloss; and appears to be covered as it were with a fine powder, its beautiful black colour changing into a dirty green, and the surrounding cuticle becoming thinner and more transparent. At last the substance is almost entirely dissolved, and the whole plant converted into a black-green mucilage.

The fruit-grains within the colourless pellucid substance are small, round, transparent, clear, and disposed in simple lines, bent and interlaced, and resembling rows of beads: they are easily displaced, and then lie dispersed without order within the substance.

In drying the vegetable corrugates, turns black and shapeless, but if soaked in water will again swell to its former state. If the mould on which this species grows be kept sufficiently moist, from its first perceptible state to its complete dissolution, it will take from four to six weeks.

Obs. 1. The change of colour observable at the time of maturity of the grains, does not appear to be owing entirely to a change in these, which are generally transparent, clear, and colourless; but more to the surrounding cuticle at this period becoming thinner and dissolving, and thus exposing the lines of fructification in the substance: this makes the surface appear to the naked eye as if strewed over with a fine powder.

Obs. 2. From *Tremella granulata* this plant is distinguishable—1. By the want of a short stalk and of the root-like fibres. 2. By its blacker colour and the greater gloss of the whole surface. 3. By its more consistent gelatinous substance, and the situation of the fruit-grains.

2. *LINCKIA pruniformis*.

L. subglobosa, solitaria, superficiei æqua, viridis.

Linckia pruniformis. *Wiggers Prim. Fl. Holsat. p. 94.*

Roth Fl. Germ. tom. iii. pars 1. p. 548.

ULVA pruniformis subglobosa, solitaria, intus succulenta.

Linn. Syst. Pl. ed. Reich. tom. iv. p. 586. Weigel

Obs. Bot. p. 40. obs. 83. t. 2. f. 4.

This species, found in sweet water upon putrid wood and the branches of large water plants, is generally of a globular form, but sometimes rather ovate or oblong, of a dark green or yellowish colour, and without a targeted base. It is most frequently found solitary, but not seldom in groups. Its form is preserved by a strongish, smooth, glossy membrane, varying in size according to its age, from that of a small pea to a large cherry: its inner substance is also different at different periods: in a younger state it is hardish, almost cartilagineous, but soon after becomes gelatinous, and, in proportion as the grains approach maturity, thin, watery, and at last mucilaginous. These changes are in exact proportion with those that the external cuticle undergoes, which is at first thicker and darker, but as it advances in growth becomes thinner and more transparent, and acquires a light or yellowish green colour.

The grains within the inner clear and colourless substance are round, smaller than in the former species, transparent, of equal size, and disposed in undulating lines, resembling wires bent in waves, the curvatures of which are equal in size and form.

As long as this vegetable contains its inner substance it dries with great difficulty, but at length shrinks and becomes horny: if, however, an aperture be made in it, and the inner substance gently pressed out, it easily dries, preserving its round form, and resembling a horny membrane. It is with great difficulty that it recovers its original shape by being soaked in water. This species does not seem to live above a year; for towards the end of summer

it

it has attained the highest degree of perfection, and in autumn no traces of it are to be found in those places where before it had been seen in abundance.

Obs. In all the species of this genus known to me the fruit-lines are curved, but in none of them are they undulated as in that just described.

**** *Forma varia, plicato-gyroscæ.***

3. *LINCKIA Nostoc.*

L. subrotunda, difformis, plicata, undulata, virescens, demum membranacea et fugax.

TREMELLA terrestris, gelatinosa, membranacea, vulgarissima. Michel. Nov. Gen. p. 126. t. 67. f. 1.

T. Nostoc subrotunda, difformis, plicata, undulata, e luteo virescens. Roth Fl. Germ. tom. iii. pars 1. p. 555. cum synonymis.—Linn. Syst. Pl. ed. Reich. tom. iv. p. 562.

T. terrestris, sinuosa, pinguis et fugax. Dill. Hist. Musc. p. 52. t. 10. f. 14.

Those who have not observed this plant in all its different states, or employed sufficient magnifying powers for examining its structure, will from its habit take it either for a *Tremella* or an *Ulva*. As to its external appearance, the *Nostoc* bears, indeed, no resemblance to the two preceding species of *Linckia*; but the situation and direction of its fruit-lines prove beyond a doubt that it is a congener of them, as it was justly considered to be by Micheli. It is found in spring and autumn, in moist weather, on grass plots and meadows, and sometimes also in garden-walks.

In its younger state, when of the size of a hazel-nut or nutmeg, it perfectly resembles a wrinkled *Tremella*: it then is of a white, yellowish, or greenish colour, wrinkled, sinuose, and lobed, so that it appears to be composed of several roundish bodies; containing, within a pretty strong cuticle, a gelatinous, hardish, rather cartilaginous, transparent, and co-

lourless substance. When viewed under a microscope it shows nothing but faint curved lines, and the surrounding cuticle appears wholly destitute of the fibrous texture peculiar to the Tremellæ. As it advances in growth the plant expands uniformly every way, so that at last it appears like a gelatinous, thin, lobed, wrinkled, sinuate membrane, with simple rather thickened margins, projecting over the earth in roundish but irregular masses, that are often several inches in diameter. The inner substance, of a thick consistence when the plant is young, expands uniformly with the outer membrane, and is extenuated so considerably as to be scarcely perceptible between the two delicate lamellæ, resembling a thin watery transparent fluid. The plant is, however, easily known, even on first sight, by its external appearance, the constant lubricity of its surface, and its tremulous motion when touched. If a small piece be cut off, and subjected on a glass slider with a few drops of water to the microscope, the two membranes are not perceptible on account of their transparency and delicate structure; but the substance contained between them will soon be seen to mix with the water, which it resembles in point of clearness.

The grains within the substance are disposed, as in *Linckia granulata*, in simple curved lines, interlaced with each other.

When arrived at full maturity, both the inner substance and the surrounding cuticle dissolve, and leave nothing but a mucilaginous mass.—In drying the Nostoc shrinks to such a degree as to resemble a horny membrane; but easily recovers its pristine shape when soaked in water.

4. *LINCKIA verrucosa*.

L. palustris gelatinosa, saxi adnascens, ex obscuro fulva et concava, vesicam referens. Micheli Nov. Gen. p. 126. t. 67. f. 2.

TREMELLA

TREMELLA verrucosa, tuberculosa, solida, rugosa. *Linn. Syst. Pl. tom. iv. p. 563.*

I have not myself as yet found this species, which according to Micheli and Linnæus is seen on stones in brooks and rivers; but from Micheli's description it undoubtedly belongs to this genus.

The real **TREMELLÆ**, on which I shall now treat in order, have nothing in common with the *Rivulariæ* but the gelatinous substance. They however approach very near to the *Linckia*, in having a jelly included within a membrane. As for their internal structure, it requires not a considerable magnifying power to perceive its total difference from that of the others. This will be clearer by the following general remarks.

1. The outer cuticle, to which the *Tremellæ* owe their different forms, is thicker and more opaque than that of the *Linckia*, and consists of a strong fibrous texture, which is the seat of their respective colours.

2. The grains of fructification that are generated within the fibrous texture of the outer cuticle, are for the greatest part round and opaque; they are disposed without order, each at some distance from the other, and separately fixed to the texture by means of a delicate and transparent thread. They never quit their places, not even when arrived at perfect maturity.

3. The inner substance is clear, transparent, and without any traces of organical structure, even when viewed through a powerful microscope; in some it is thin and watery, and easily issues when an opening is made into the outer cuticle: in the generality of them, however, it is completely gelatinous, so that it can be cut into pieces. The more the plant advances in age, the more fluidity the

inner substance acquires ; whence it evaporates more easily in an old than in a young state.

4. As soon as the grains are arrived at perfect maturity, the plant dies away : in some the outer cuticle is dissolved together with the jelly, which becomes a mucilaginous mass ; but in the generality of them the inner substance evaporates at that period, while the outer cuticle shrinks, becomes dry, and is dispersed with its grains by the winds.

5. The Tremellæ, in common with the Linckiaæ and other cryptogamous aquatic plants, though preserved in a dry state for several years, will by being soaked in water recover their original appearance. They are generally found in open air on the ground, and chiefly on withered wood. The continuance of wet weather is indispensably required for their growth.

6. Linnæus, and after him most botanical writers, have classed the Tremellæ with the order of Algæ ; but Dr, Persoon, in his excellent *Synopsis Methodica Fungorum*, assigns them a place among the mushrooms. Many species of this genus approach indeed very near in their external habit to the Fungi ; but their near relationship to the Linckiaæ, and hence also to the Rivulariæ, and the other cryptogamous aquatic plants, seems to justify my retaining them in the order of the Algæ. Their resuming their former shape by being soaked, is likewise a character they have in common with other Algæ, but which is not the case with the mushrooms. Besides, in disposing vegetables according to an artificial system founded on the diversity of the parts of fructification, we should not be induced by their external habit, or their various places of habitation, to separate them from such as are nearest related to them in their internal structure.

TREMELLA.

Substantia uniformis, gelatinosa, hyalina, integumento membranaceo

membranaceo induta : fructificationum granulis in membranæ contextu fibroso absque ordine sparsis.

* *Superficie æqua.*

1. *TREMELLA granulata.*

T. sphaerica, aggregata, sparsa, superficie æqua, sessilis, filamentis radicata, flavescenti-viridis.

T. granulata. Roth, *Fl. Germ. tom. iii. pars 1. p. 552. cum synonymis.*

ULVA granulata sphaerica, aggregata. Linn. *Syst. Plant. ed. Reich. tom. iv. p. 586.*

This species is frequently generated in low muddy places, after the water has evaporated, and the mud been exposed to the open air. The younger plants make their appearance in the shape of green powdery grains, but, as they grow older, form globular or sometimes oval, single or crowded vesicles, of a light or yellowish green colour, and of the size of mustard or hemp seed. They are fixed to the mud by means of a very short stalk, and some branched threads, that issue from the lower surface, resembling capillary tubes, and spreading in the mud.

The outer cuticle is very thin, almost transparent, even, smooth, and elastic. If separated from the substance, and examined with the microscope, it is found to consist of a fibrous transparent texture, less close than that of the following species, and containing the round grains in great number, but all placed singly and straggling.

The inner substance is thin, more watery than gelatinous, and flows out when an aperture is made through the outer cuticle. It equals in clearness the purest water, and the magnifying glass discovers no grains or other traces of organization in it.

When the grains have attained their utmost perfection, the inner substance seems to dissolve the outer cuticle, which becomes yellower, and so transparent that the grains

within may be easily perceived through it: the inner substance evaporating, and the outer cuticle losing its elasticity, the whole upper surface becomes concave, and assumes the form of a dish. At last the under part of the plant, as far as it sticks in the mud, is nearly dissolved, the grains fall to the bottom, and the upper part becomes an empty, whitish, and very delicate membrane. In drying this vegetable loses its proper shape, the outer cuticle collapses, and requires several days' soaking to recover its original elasticity.

OBS. This species bears great resemblance, especially in its external form, to the above described *Linckia granulata*: but a close comparison will show that they are far from being even congeners.

2. *TREMELIA fungiformis.*

T. subsessilis, truncato-plana, suborbiculata, fusca, superficie utrinque æqua; disco nitido.

PEZIZA gelatinosa mollissima, truncato-plana, subrepanda, fusco nitens, stipite obliquo. *Persoon Synops. Meth. Fung. p. 633. n. 4.*

Dr. Persoon first discovered this vegetable on the great round-leaved Sallow (*Salix Caprea*); and I myself met with it on the Black Poplar (*Populus nigra*). Towards autumn, in wet weather, there issue from the rotten bark of decayed trees single, reddish, gelatinous papillæ, which by degrees assume the appearance of young stalkless Agarics or Boleti. The whole plant is smooth, dark brown, gelatinous, and nearly transparent, and fixed, by means of a small, black, round, targeted base, beneath the epidermis of the bark of the branches: from this base, but rather laterally, issues, in an oblique direction, a very short stem (*truncus*) scarcely half a line long, but gradually dilated to a roundish, flat, glossy disk, of from four lines to half an inch diameter, and bordered by a smooth even margin.

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The thin outer cuticle consists of a dense, fibrous, brown texture, in which are fixed a number of small round grains, disposed without apparent order. The inner substance is perfectly clear, transparent, gelatinous, and may be cut into pieces, in which the microscope discovers no traces of organical structure.—In drying this vegetable corrugates gradually in proportion as its substance evaporates, the wrinkles beginning at the borders: the disk, however, retains its original gloss and smoothness. When soaked in water it soon recovers its pristine form.

OBS. Though this species somewhat resembles a mushroom, yet it cannot be classed either with the *Pezizæ* or *Octosporæ* of Hedwig, as its grains are not disposed in groups of eight, within a common receptacle, but are, as in the other *Tremellæ*, single, and dispersed within the fibrous texture of the outer cuticle.

**** *Superficie plicata.***

3. TREMELLA abietina.

T. gregaria, subrotunda, truncato-planiuscula, subplicata, aurantia.

T. gregaria, subrotunda, aurantia, subplicata. *Persoon Syn. Meth. Fung. p. 627. n. 16.*

There appear towards autumn in moist weather, on the bark of decayed branches of the Scotch and Norway spruce firs (*Pinus sylvestris* and *Abies*), yellow, gelatinous dots, of the size of millet seeds, arranged usually in rows. These when completely developed form oblong or more commonly roundish heaps (*acervuli*) of the size of a pea, composed of three, five, or more plants, so close together as to be contiguous, seeming to constitute a single body. The individuals of such a heap are about half a line in diameter, stalkless, truncated, of equal size, undulate-wrinkled, glossy, opaque, and orange-coloured.

The outer cuticle is thickish, and consists of a dense,
but

but very tender, half transparent, fibrous texture, containing its very minute grains disposed without order. The inner substance is a clear, transparent jelly.—In drying this plant corrugates, turns saffron-coloured and horny; but soon recovers its former shape when put into water.

4. *TREMELLA spiculosa.*

T. effusa, crassiuscula, plicato-rugosa, nigra, papillis conicis spiculosa.

T. applanata, effusa, crassiuscula, nigra, papillis conicis spiculosa. Persoon Synops. Meth. Fung. p. 624. n. 8.

T. arborea, subrotunda, plicato-gyrosa, undulata, superficie aspera, nigrescens. Roth Fl. Germ. tom. iii. pars 1. p. 556. cum synonymis.

This species is very common on old rotten stems and decayed branches of trees, and strikes the eye by its black colour and more considerable size. It makes its first appearance in small, roundish, or oblong, smooth, gelatinous heaps. At a more advanced period it spreads over the bark of the putrid branch, and is two or three inches in diameter. Its form is not regular: sometimes it is roundish, sometimes oblong, angular, or lobed: the upper surface is wrinkled, and undulate, with small conical points; the lower, or that next to the bark of the wood, flat, almost plane, of a paler colour, and villous as if covered with small furfuraceous scales.—The outer cuticle is almost as thick as common writing-paper, and consists of a dense, brownish, fibrous texture, in which are dispersed the very minute, clear, and nearly ovate grains of fructification.—The inner substance is perfectly gelatinous, clear, and transparent like water. In drying it acquires a blacker colour, and becomes horny.

The foregoing descriptions will be sufficient to give to the observer an adequate idea of the generic differences that subsist between *Rivularia*, *Linckia*, and *Tremella*, and perhaps

haps enable him more accurately to distinguish from the Tremellæ such vegetables as resemble them in external appearance, but are so distant from them in internal structure, and in the organs of fructification, that in a systematical arrangement they cannot be united under the same genus,

XVII. On the Red Byssus (*Byssus Jolithus* Linn.). From the German* of the Rev. Mr. STARKE.

THOUGH Linnæus in his *Flora Lapponica*, and afterwards in several other writings, classes this vegetable with the *Byssi pulverulenti*; yet, in his *Flora Lapponica*, and in the *Species Plantarum*, he quotes as synonyms the *Byssus germanica minima saxatilis aurea, violæ martiæ odorem spirans*, (Michel, Nov. Gen. Plant. p. 210. tab. 89. f. 3.) together with the *Jolithus Schwenkfeldi*. But Micheli has described and figured his plant as filamentous; and *Byssus Jolithus Schwenkfeldi*, which is frequently met with on mountains of Germany, as also that which is found in the Hartz, belong to the *Byssi filamentosi*: it is therefore rather surprising that Linnæus, and other botanists after him, arrange the *Jolithus* with the *B. pulverulenti*. Dr. Roth in his excellent and highly instructive *Flora Germanica* (tom. iii. pars 1. p. 564.) gives it as his opinion, that either Linnæus, for want of a more minute examination, had overlooked the filamentous structure of his *B. Jolithus*, or that the moss, the specific name of which he derived from its violet smell, may be a different species from the German one and from Micheli's plant; perhaps *LEPRA odorata* of Wiggers. The former supposition appears improbable to me, from the following reasons:

1. The filamentous structure of our German species is

* Schrader's Journ. für die Botanik. IIr. Band p. 340.

clearly observable by means of a very moderate magnifying power.

2. Linnæus himself states that the Swedish species is distinguishable from the foreign by its pulverulent nature. In his *Journal of a Tour through Oeland and East Gothland* (page 10), he observes, "Every where near the roads I saw stones covered with a blood-red pigment, which, on being rubbed, turned into a light yellow, and diffused a smell of violets, whence they have obtained the name of violet stones: though indeed the stone itself has no smell at all, but only the moss with which it is dyed. *This Byssus does not, as the foreign one, consist of filaments, but of a fine farina.*"—From this it appears that Linnæus was not only well acquainted with the foreign filamentous species, but also that he considered the pulverulent nature as a characteristic of that found by him.

3. Dr. Acharius, in his excellent *Lichenographia*, likewise states that *Byssus Jolithus* is frequently found as pulverulent; but as it is met with in a filamentous state in Germany and other parts of Europe, he has not only altered the *differentia specifica*, but also in a note put the query: Whether the filamentous structure of this *Byssus* is converted, when old, into a pulverulent one*?—This I doubt, as the specimens which I have, obtained many years ago, still continue to preserve their filamentous nature.

It seems more probable to me that there is still another moss resembling our *Byssus Jolithus* in scent and colour, but which is pulverulent instead of filamentous. This conjecture is supported by Retzius's classing the northern *Jolithus* with the *Lichenes leprosi*, in his *Prodromus Floræ Scandinaviæ*, ed. ii. where he ascribes to it *peltæ minutissimæ planæ turbinatæ albidæ*, quoting fig. 1. tab. 899. of the *Flora Danica*. As I have not yet had an opportu-

* In his *Methodus Lichenum* Dr. Acharius has the *Byssus Jolithus* among the dubious species of his genus *Lepraria*. Tr.

nity of consulting the latter expensive work, I am ignorant whether in that figure the *peltæ* are really represented; but it is remarkable that Acharius, who likewise refers under *Lichen Jolithus* to the figure of *Flora Danica*, should not have made the least mention of its fructification*.

Whether the plant described by Retzius be the same with *Byssus Jolithus* Linn., and, which is Dr. Roth's opinion, with *Lepra odorata* of Wiggers (*Primitiæ Fl. Holsat. p. 96.*), I am unable to decide, as I have never seen the latter. The respective stations of these two species render it, however, a matter of doubt; *Byssus Jolithus* Linn. grows upon stones, while *Lepra odorata* is only found upon wood; though it might be urged against this, that there are several cryptogamous plants found indiscriminately upon both.

To those botanists who possess specimens of the real Swedish *Byssus Jolithus* Linn., and of the German species, it will be easy, on accurate examination, to decide whether they are different from each other in their structure, and whether that of Linnæus is really pulverulent. Should this be the case, it would prove that both are distinct species, and that the latter really belongs to the *plantæ lichenosæ*. Thus, likewise, those botanists who are possessed of *Byssus aurea* Linn., will be able to decide whether it have *no* smell even in its fresh state, as we find expressly stated by Micheli; for in this case, notwithstanding their similarity, it would be right to consider it a distinct species from *B. Jolithus Germanica*, as has been done by Micheli and Linnæus.

If the proposed conjecture should lead botanists completely to settle the differing opinions respecting *Byssus Jolithus*, the end of this paper would be completely answered, and my wish fulfilled.

* The figure in *Flora Danica* has, indeed, something like *peltæ*, but indistinctly expressed, and throws no light upon the subject. Tr.

XVIII. *Observations on the Genus Phyllachne, by Professor SWARTZ*.*

THE celebrated and learned John Reinhold and George Forster, on visiting, in 1772, the eternal snows of the countries of the south pole, discovered, among other singular plants, on the rocks of Terra del Fuego, the genus PHYLLACHNE, the only known species of which they named *uliginosa*, from the place of its growth. It belongs, according to the opinion of both the Forsters, who examined the flower of this plant on the spot, to the twenty-second class of the Linnean system; the correctness of which assertion I should scarcely have doubted, had not its singular habit induced me once more to examine its sexual organs, which are so very minute as to require the aid of the microscope to discover their real structure.

The *character naturalis* of Phyllachne has been given as follows :

Calyx triphyllus, superus.

Corolla tubulosa, patula, laciniis quinque obtusis.

In flore masculo.

Filamentum unicum e medio baseos corollæ, longitudine tubi. *Anthera* globosa, trisulca.

Glandula minuta ad basin filamenti utrinque.

Rudimentum Germinis inferum seminibus fæctum.

Stylus nullus. *Stigma* nullum.

In flore fæmineo stirpis diversæ.

Calyx et *Corolla* supera maris.

Germen inferum, turbinatum. *Stylus* filamentis simillimus, basi glandulis duabus præditus. *Stigma* e glandulis quatuor compositum, quarum duæ majores, duæ minores laterales, discolores.

Fructus (maturus ignotus) unilocularis, polyspermus.

I was very much surprised to find that the discoverers of

* Schrader's Journ. für die Botanik, vol. i. p. 273.

this vegetable attributed to the male flowers a germen beneath the corolla with rudiments of seeds*. When afterwards, through the kindness of Professor Sparmann, by whom it had been examined with the two Forsters in its native place, I received a small turf of Phyllachne, I had the pleasure to become more intimately acquainted with its construction. The quality it has, in common with the mosses, of recovering its pristine freshness by the application of moisture or steam, facilitating my examination, I was enabled to write down the following observations, which, when compared with the above generic character, will merit the attention of the botanist.

The *calyx* is double, one below, the other above the germen; the *lower* one consists of two, seldom three, linear, acute leaflets, longer than the germen: these cannot be considered as bractæ, since they are attached to the base of the germen, and from the real leaves they are also distinct both in form and colour. The *upper* calyx consists likewise of two or three leaflets, shorter than the corolla.

Corolla somewhat exceeding a line in length, tubular, but little widening upwards, appearing almost bell-shaped under the microscope; hence it is neither filiform† nor funnel-shaped‡. The five segments of the limb are oblong, obtuse, spreading, and of equal length with the tube.

The opened corolla displays what is called the filament, ascending from the centre of the germen at the bottom, and furnished on both sides of its base with a small gland. The situation of this pretended filament on the germen, together with its persistence, suggested to me the probability of its having the functions of a female organ: this conjecture was soon converted into conviction, when I

* "Mirum in hac planta flores masculos, quamvis styli carentes, germinibus tamen impositos esse, quæ etiam rudimentis seminum gaudent." Forst. Charact. 58.

† Commentaria Soc. Gotting. ix. p. 43.

‡ Linnæi Suppl. Pl. p. 62.

found that it thickened towards the top, where, indeed, it was furnished with two round anthers, that opened transversely, and contained a yellow roundish pollen; but between which I observed very small glandulous excrescences, that undoubtedly are the double stigma protected on both sides by the upper reflected valves of the opened anthers. All these parts taken together have the appearance of an "*anthera trisulca, sulcis lateralibus dehiscentibus**." In the female flowers the stigmas are larger, capitate, double, and furnished at each side with a very small, closed, and yellow body, which are the two abortive anthers, but which Messrs. Forster mistook for glands.

The fruit, which probably retains the turbinate shape of the germen, was not yet ripe in the specimens I examined, one-celled, containing many oblong, yellow seeds, fixed by short stalks to the top of a detached upright receptacle.

The rudiments of similar fruit and seeds are likewise found in the flowers with fertile anthers.

Thus we may account for a germen being found in a male flower, though in fact this term is improper; for though the flowers with perfect anthers may perhaps not ripen their seeds, yet these anthers are obviously placed on the female organs. *Phyllachne* affords, therefore, a weighty argument for retaining the twentieth class of the Linnean system; for, even if this plant should prove to have separated sexes, it would still find its place in *Diœcia Gynandria*†: but according to my opinion it is more properly placed, together with *Forstera* (which is likewise an inha-

* *Commentar. Societ. Gotting. ix. p. 43.*

† Nor even in this case ought *Phyllachne* to be placed in one of the classes with sexes on separate flowers, unless the same be done with a great number of other plants; with most of those of the natural order of *Sapindi* for instance, in the flowers of which we generally observe either male or female organs singly in perfection, those of the other sex being abortive, or incomplete, or not coming to maturity at the same time: whence hermaphrodite fecundation can seldom take place in these plants. *TRANSL.*

bitant of the southern hemisphere and the alps of New Zealand), in *Gynandria Diandria*.

Linnæus supposed *Phyllachne* to be monœcious*; but I am inclined to Forster's opinion, that the male and female flowers are on distinct individuals.

According to these observations, the natural character of the genus will stand as follows:

PHYLLACHNE.

Cal. perianthium duplex.

Inferum 2—3-phyllum: foliolis lineari-lanceolatis erectis.

Superum 2—3-phyllum: foliolis linearibus acutis, tubo brevioribus.

Cor. monopetala: *tubus* patulus; *limbus* quinquefidus, patens: laciniis oblongis obtusis longitudine tubi.

Stam. *Filamenta* nulla. *Antheræ* duæ, apici pistilli ad latera stigmatis insidentes, distinctæ, globosæ, uniloculares, transversim extrorsum dehiscentes, polliniferæ vel exiguæ, steriles.

Pistill. *Germen* turbinatum, inferum. *Stylus* filiformis, erectus, corolla longior, basi utrinque glandula notatus, persistens. *Stigma* globoso-didymum intra antheras steriles, vel minutum, valvulis antherarum fertilium revolutis inclusum.

Per. turbinatum, uniloculare, polyspermum.

Sem. oblonga apici receptaculi centralis liberi turbinati acuminati pedicellis adnexa.

OBS. Fructus in floribus antheris fertilibus præditis forte abortiunt.

To the description given of *Phyllachne uliginosa* by

* Supplementum Plantarum, p. 62.

G. Forster in the *Commentationes Societatis Gottingensis*, vol. ix., I add the following observations :

Leaves sessile, imbricated, thickish, upper ones widened towards the base, convex at the back, with cartilaginous rather serrated margin, striated when viewed under the microscope, besprinkled with ferrugineous dots, of a reticulate-vascular texture, like those of the *Orchideæ*.

Flowers terminal on the branches, solitary, sessile.

Explanation of Plate V.

1. The upper part of the plant ; natural size.
2. A branch of the same ; magnified.
3. A leaf ; magnified.
4. 5. The flowers ; magnified.
6. The germen with style, stigma, and anthers. This and the following highly magnified.
7. A stigma covered by one of the reflexed valves of the anther.
8. The style with the larger stigma.
9. The same viewed laterally.
10. The fruit opened longitudinally.



Phyllachne uliginosa

Engraved by P. Sanford

XIX. *Observations on Forstera sedifolia* Linn., by Professor SWARTZ*.

THIS vegetable, found on the summits of the mountains of New Zealand, has been placed by its first discoverers, the two Forsters, in the twenty-second class of the Linnean system. Having been employed a considerable time past in the examination of the Orchideæ, I was very desirous of becoming acquainted with *Forstera*, a plant appearing, from the description given of it in the *Acta Societatis Upsaliensis*, to have many characters in common with that natural order. It is but lately that I was fortunate enough to find an opportunity of examining the sexual organs of this plant; and the result of my observations will, I think, throw some additional light upon the subject.

The *calyx* is double; one below, the other above the germen†: the *lower* consists of three oval-lanceolate, obtuse, erect, rather concave leaflets, which surround the germen; the outer one inclosing the others in its dilated base. As the germen augments in size, these leaflets are pushed on one side, whence this calyx has been called *lateralis*:—the *upper* is above the germen, not six-cleft, but six-leaved, embracing the corolla: leaflets oblong, obtuse, smooth, erect, somewhat convex and ciliated.

Tube of *corolla* bell-shaped, short, situate on the summit of the germen: border deeply cleft into six equal, oblong, linear, obtuse, and undivided segments: segments double the length of the tube, smooth without; within they appear under the microscope as if covered with a fine velvet.

* Schrader's Journ. für die Botanik, vol. ii. p. 31.

† This has already been observed by Professor von Schreber in his edition of the *Genera Plantarum*.

In the centre of the corolla is a filament-like *columnula*, about two-thirds of the tube in length, somewhat dilated towards its base. At the summit of this organ are placed two hemispherical unilocular *anthers*, that open transversally into two valves, the lower of which is the smaller. These anthers are connected together by means of a fleshy septum, that rises like a crista of fine hairs, between the two reddish, rounded knobs or *stigmas*, which are protected by the two upper concave valves of the anthers, and obviously terminate the *style*, which pierces the columnula, but is intimately united with it. The style has the appearance of being cleft at the place where the two anthers communicate.

According to the description and figure given of Forster in the *Acta Upsaliensia*, the two real anthers are mistaken for leaf-like scales of a nectary; the stigmas on the other hand are called anthers, while the projecting crista of fine hairs is considered as stigmas bearing the anthers laterally. But this is certainly an error, which I take this opportunity of correcting. That the small bodies placed at the apex of the columnula are anthers, appears from their form, their inner cavity, the opening reflected valves; and, lastly, from the real pollen they contain. The lower valve is not noticed in Forster's description, and the upper he considers as a scale of the nectary. The projecting crista between the stigmas is depressed in the middle, and appears two-lobed under the microscope; but still it cannot be taken for the stigma, as the two roundish bodies, the real stigmas, are placed exactly at the apex of the style.

According to these observations, the amended generic character of FORSTERA will be as follows:

Cal. Perianthium duplex: exterius inferum triphyllum: foliolis oblongis, acutiusculis, longitudine germinis; interius superum, hexaphyllum: foliolis oblongis, concavis, acutis, erectis.

Cor.

Cor. monopetala, tubuloso-campanulata. *Tubus* calyce superiore brevior. *Limbus* sexpartitus: laciniis lineari-oblongis, obtusis, patentibus, æqualibus.

Stam. *Filamenta* nulla. *Antheræ* duæ apice pistilli insidentes, distinctæ, sed septo carnosio conjunctæ, globosæ; uniloculares, transversim extrorsum dehiscentes: valvulis duabus hemisphæricis, demum revolutis; inferiore minore.

Pist. *Germen* ovatum, inferum. *Stylus* columnaris, corolla brevior, filiformis, erectus, apice extimo inter antheras bifidus in *stigmata* duo subrotunda crista pubescente interstincta, valvulis superioribus antherarum concavis obvolutis.

Per. *Capsula* ovalis, unilocularis.

Sem. numerosa, receptaculo columnari affixa (*Forster*).

I have not had an opportunity of examining the fruit.

FORSTERA sedifolia is herbaceous; its leaves are imbricated, obovate, obtuse; borders subpellucid, rounded, quite entire, fleshy, smooth, their concave base appressed, upper part spreading, sometimes reflex, dotted and veined when viewed toward the light, below somewhat keeled, dorsal rib rather widened at its base.—Peduncles solitary, filiform, erect, lengthened out, one-flowered.—Flowers half an inch long, erect (whitish or flesh colour according to *Forster*).

On comparing this description of *Forstera* with that given by me of *PHYLLACHNE uliginosa* Linn., there appears a very great resemblance between these plants. Both are natives of the South Sea. The leaves of both are sessile and imbricated. The flowers are situate at the extremities of the branches. The calyx is double. The corolla is tubular-bell-shaped. Commerson has observed from six to seven segments in the corolla of his *Stibas* (*Phyllachne*).—The anthers are in both placed at the upper part of the style, are of the same construction, and between them are

seen the two stigmas included within the upper valves of the anthers.—The fruit in both is unilocular, many-seeded, and furnished with a columnar receptacle. The glands, however, at the base of the style of *Phyllachne*, are not found in *Forstera*.

Both these genera may perhaps be properly united into one; in which case I should propose the following generic character:

Cal. Perianthium duplex: inferum 2—3-phyllum, foliolis erectis; superum 2—3—6-phyllum, foliolis erectis.

Cor. monopetala, tubuloso-campanulata: tubus brevis, limbus 5—6-partitus: laciniis æqualibus, oblongis, patulis.

Stam. Filamenta nulla. Antheræ duæ apici pistilli insidentes, globosæ, uniloculares, bivalves: valvulis extrorsum transversim dehiscentibus.

Pist. Germen inferum. Stylus columnaris, filiformis, erectus. Stigmata duo, subrotunda, valvulis superioribus antherarum concavis inclusa.

Per. Capsula unilocularis, ovalis.

Sem. numerosa, receptaculo columnari in medio capsulæ adsidentia.

Character essentialis:

Cal. duplex: inferus 2—3-phyllus; superus 3—6-phyllus.

Cor. tubuloso-campanulata, 5—6-fida.—Caps. 1-locularis, polysperma.

Locus in systemate sexuali: Gynandria Diandria.

The natural order to which this genus belongs is perhaps still undetermined*; and it may possibly constitute a new one, in conjunction with some other genera.

* *Forstera* and *Phyllachne*, together with *Lobelia* and some other kindred genera (among which there is an undescribed New Holland genus in whose flowers Mr. Bauer of Kew has observed the most striking instance of vegetable irritability), constitute a new natural order, next to the *Campanulaceæ* of Jussieu, the elements of which we shall have an opportunity of exhibiting at another time. TRANSL.

XX, ¹⁸⁰⁰Supplementary Remarks on Professor WILLDENOW'S
new Edition of LINNÆUS'S *Species Plantarum*. Berlin,
1797—1800. From the German of Dr. ROTH.

[Continued from page 152.]

24.

DACTYLIS stricta spicis terminalibus subgeminis, floribus
remotis adpressis, culmis folisque strictis. *Sp. Pl.*
Vol. 1. p. 407.

This species, having a one-flowering calyx and a simple
and very long style, partakes so little of the generic
character of *Dactylis*, that Prof. Schreber, in his new edition
of Linnæus's "*Genera Plantarum*," thought it necessary
to make a new genus of it, which he called *Spartina*, and
which should be placed in the first order of the third class
of the Linnæan system, between *Nardus* and *Lygeum*. The
reason why Prof. Willdenow has not adopted this new
genus in the *Species Plantarum*, I cannot guess. Whether
Dactylis Cynosuroides Linn. *Sp. Pl.* l. c. also belongs to
this genus, as some circumstances appear to indicate, I am
unable to decide, not having yet had an opportunity of
examining this grass*.

Last year I received seeds of a grass under the name of
Phleum schoenoides Jacq., which has flowered with me this
year, and produced ripe seeds. This completely answers
the generic character of *Spartina*, and there is no genus in
the system to which it can be referred with greater pro-
priety. With regard to the structure of the calyx and the
inner glumes, it approaches nearest to *Phleum*, but the
long simple style is a striking difference. Whether, how-
ever, this grass be *Phleum schoenoides* Jacq. *Collect. 1.*

* Michaux (*Fl. boreali Amer.*) separates *Dactylis cynosuroides* L., and
two other grasses, into a new genus, which he calls *Trachynotia*: the gene-
ric character which he has prefixed appears to warrant Dr. Roth's con-
jecture. TRANSL.

p. 111., or *Crypsis aculeata* β. Sp. Pl. tom. 1. p. 158., with all the synonyms that are there quoted, I have not been able to ascertain, not possessing either the works of Jacquin or Cavanilles*. All that I can assert with safety is, that the synonym of Scheuchzer, given to *Phleum schœnoides* in the older editions of Linnæus, belongs to my plant, as may be seen from the following description.

SPARTINA. *Linn. Gen. ed. Schreber. n. 98.*

Calyx bivalvis, uniflorus; valvulis navicularibus. **Corolla** bivalvis, subæqualis. **Nectarium** nullum. **Semen** nudum.

1. **SPARTINA stricta:** S. spicis geminis erectis, spiculis secundis adpressis, foliis involutis.

Dactylis stricta spicis terminalibus subgeminis, floribus remotis adpressis, culmis foliisque strictis. *Hort. Kew. 1. p. 104. Linn. Sp. Pl. tom. 1. p. 407.*

DACTYLIS stricta spicis geminis erectis lævibus, spiculis secundis pubescentibus. *Smith Fl. Brit. vol. 1. p. 110.*

DACTYLIS cynosuroides Lœffling Iter 115. ed. Germ. p. 165.

Folia involuta, rigida, stricta, mucronata. **Spicæ** terminales, geminæ, rarius ternæ: spiculis secundis, duplici serie alternatim imbricatis.

2. **SPARTINA Phleoides:** S. panicula spicata, compacta, ovali-oblonga, basi involucrata vaginis foliorum ventricosis, foliis planis,

CRYPsis schœnoides spicis obovatis glabris, basi vagina foliacea cinctis, caulibus ramosis procumbentibus. *Lamarck Illustr. n. 655. tab. 42. fig. 1. Desfont. Atl. 1. p. 62.*

CRYPsis aculeata β. Linn. Spec. Pl. tom. 1. p. 158.

PHLEUM schœnoides spicis ovatis obvolutis, foliis brevissi-

* It is undoubtedly Jacquin's plant. As for Cavanilles (Icon. i. tab. 52.), it is to be observed that the figure marked with V is *Phleum schœnoides* L., and that without a mark *Crypsis aculeata*. TRANSL.

mis mucronatis strobilicaulibus. *Linn. Syst. Pl. ed. Reich. I. p. 164. Jacq. Collect. I. p. 111.*

Gramen maritimum typhinum brevi et crassiori spica ad singula genicula prodeunte, secundum. *Scheuchz. Agrost. p. 66. Monti Gram. p. 30. Leon. fig. 33. bona!*

Habitat secundum *Syst. Pl. ed. Reich. l. c.* in Italia, Smirnae inque Hispania. ☉ ♂ !

Radix fibrosa, caespitosa. Culmi nonnulli filiformes, angulosi, procumbentes, in culta planta erectiusculi, virides, glabri, palmares et pedales, debiles, superne praesertim flexuosi, ramosi: Rami e vaginis alterni, breves, floriferi: Nodi flavescentes, vix parum elevati, octo ad decem.

Folia linearia, plana, striata, nervo dorsali eminentiore, villosa, in mucronem tenuem attenuata, tamen non rigida, nec pungentia: radicalia sesquiunciam ad duas uncias longa: caulina inferiora et media digitalia et longiora: superiora sensim magnitudine decrescentia, ita, ut floralia duo, involucrum mentientia, uncialia et semiuncialia tantum, angustiora et versus apicem canaliculata evadant. Vaginae glabrae, striatae, internodiis breviores: foliorum inferiorum culmum arcte includentes, teretes; foliorum superiorum laxae, in medio ventricosae, subcompressae; floralium duorum ovales, reliquis breviores et ventricosiores, approximatae, paniculam infra medium obvallantes.—Ligula nulla, nisi margo pilis erectis ciliatus.

Panicula in culmo ramisque terminalis spicata, multiflora, compacta, subcompressa, ovali-oblonga, obtusa, 4 lineas ad semiunciam et unciam fere longa, in medio, ubi latissima, duas lineas crassitiae vix superans, nunquam absolute a vaginis foliorum duorum floralium egrediens, brevissime pedunculata, composita fasciculis florum pedicellatis.—Pedicelli 4—6-flori, vix semilineam longi.

Calyx:

Calyx : Gluma uniflora, bivalvis, compressa, mutica ! Valvulis navicularibus compressis lanceolatis, conniventibus, membranaceis, dorso nervo valido viridi aculeato carinati ; interiore paululum majore.

Corolla bivalvis, inæqualis, mutica ; valvula exterior calycinis valvulis omnimode similis, at paulo longior et latior, vaginans interiorem paulo minorem, totam membranaceam, diaphanam, nervo dorsali destitutam, obtusissimam, calycis majori valvulæ æquantem, glaberrimam.—Nectarium nullum.

Stamina constanter 3. Filamenta hyalina, tenuissima, erecta, corolla duplo fere longiora ; antheræ flavæ, oblongæ, didymæ, erectæ, demum utrinque bilobæ : decoratæ membranaceæ, diaphanæ.

Pistillum : Germen obovatum, exiguum, flavescens. Stylus filiformis, simplicissimus, flexuose adscendens, longitudine filamentorum. Stigmata 2, aculeata.

Semina exigua, nuda, compressa, utrinque attenuata, grisea et nitida ut in *Phalaridibus* *.

35.

DACTYLIS littoralis Spec. Pl. tom. 1. p. 408. To this belongs

Gramen caninum maritimum monspeliense. Plukenet Alm, tab. 33. f. 3.

36.

CYNOSURUS coracanus Spec. Plant. tom. 1. p. 415 ; to be added :

Eleusine coracana Gærtn. Fruct. et sem. pl. 1. p. 8. tab. 1. f. 11.

* Dr. Host, in his excellent work, has likewise made of this grass, with the addition of *Phleum alopecuroides* of Mitterpach, a new genus, called *Helosciola* ; but he has not ascribed to it a simple style. TANAL.

37.

Between *FESTUCA amethystina* and *F. reptatrix* Sp. Pl. tom. 1. p. 420, 421. is to be inserted:

FESTUCA dinaricata: *F.* panicula secunda, laxa, rigida, patentissima: ramis refractis articulatis, spiculis linearibus octofloris submuticis. *Roth Catalecta bot. fasc. 2. p. 4.*
F. dinaricata culmo basi geniculato; spiculis compressis, elongatis, muticis, paniculato-divaricatis. *Desfont. Atl. I. p. 89. t. 22.*

Hab. in arena ad littora regni Tuncetani. ☉.

Between *FESTUCA dumetorum* and *F. myurus* Sp. Pl. tom. 1. p. 422:

FESTUCA Alopecurus: *F.* racemo subspicato, spiculis alternis distichis aristatis, corollis villosa-ciliatis. *Schousboe Maroc. I. p. 40.*

Hab. in arena mobili prope Tingidem. ☉?

In culta planta racemus transit in paniculam secundam speciosam.

38.

Neither under this genus, nor in the whole order, can I find *FESTUCA phœnicoides* racemo indiviso spiculis alternis subsessilibus teretibus, foliis involutis mucronato-pungentibus. *Linn. Mantissa, p. 33. Syst. Pl. ed. Reichard I. p. 206.* This species seems to be nearly related to my *Triticum fragile* *Cat. bot. fasc. 2. p. 7.*, and I should have taken it for the same, in consequence of the synonyms, but for the spikelets, which Linnæus pronounces to be *teretes*, whilst those of my plant are *compresso-planæ*.

39.

BROMUS.—Though the generic character which Linnæus gives to *Bromus* runs thus: “Spicula oblonga, teres, disticha, arista infra apicem;” yet he placed under this genus several grasses, in which the awn does not come out from

from below the top of the outer glume, but of which the point runs out into an awn. Hence some botanists have been induced to transfer these species to *Festuca*, to which they show a nearer relationship. But Mr. von Schreber endeavoured to find out a better character for the genus *Bromus*, which he has inserted in his edition of the *Genera Pl. Linn.* p. 818. namely: "*Germen terminatum foliis duobus ovatis, tenuissimis, emarginatis, erectis.*" Prof. Willdenow has forgotten to make use of this emendation in his edition of the *Species Plantarum*. To facilitate the knowledge of this genus, its species might be distributed into two divisions, viz. those with the awn below the top of the exterior glume (*arista sub apice petali exterioris*), and those in which this glume terminates in an awn (*arista terminali*).

40.

BROMUS squarrosus panicula nutante, spiculis ovatis, aristis divaricatis. *Spec. Pl. tom. 1. p. 430.*

It would be very difficult to know this species by this character of Linnæus, before its seeds were ripe; for as only at this period, or when dried, the awns begin to bend, this species, before that time, cannot well be distinguished from similar ones, such as *Bromus arvensis* and *mollis*, unless another character be substituted.

BROMUS squarrosus: *B. panicula nutante, spiculis ovatis: aristis floralibus rectis, seminalibus divaricatis, β. villosus. Spiculis incano-pubescentibus.*

This variety is found in the Palatinate with the former; and is distinct from *Bromus mollis* L. by its drooping panicles and the curved awns of the ripe seed.

41.

BROMUS asper *Spec. Pl. tom. 1. p. 432.* has no claim to the synonym of *BROMUS versicolor* panicula patente, spiculis angustis linearibus arista longioribus, *Pollich Hist. Plant. Palat.*

Palat. n. 109; for both from the dried specimens, collected by Dr. Koch, of Kaiserslautern, on the spot pointed out by Pollich, and from specimens raised from seeds in the garden, it appears that this grass is nothing more than a variety of *Bromus arvensis* L., which bears no resemblance whatever to *Bromus asper*.

42.

To *BROMUS littoreus* Spec. Pl. tom. 1. p. 433. the following synonym is to be added: *Bromus arundinaceus panicula erecta contracta, spiculis oblongis scabris subaristatis paucifloris.* Roth *Fl. Germ.* tom. 2. pars 1. p. 141.—Since all who examined this species observed, as well as me, a short awn below the top of the outer glume, the character given in the *Species Plant. loc. c.* should be altered; the more so, as *panicula scabra* is in direct opposition with *spiculæ glabræ*.

43.

BROMUS arvensis, Linn. Sp. Pl. tom. 1. p. 434. does not grow in the Palatinate, but only a variety of it, called *Bromus versicolor* by Pollich. The grass mistaken for the former by this botanist, is, according to the specimens which were collected by Dr. Koch, at the places pointed out by Pollich, *Bromus erectus* of Dr. Smith, omitted by Willdenow.

44.

BROMUS racemosus. B. racemo simplicissimo, pedunculis unifloris, floribus sexfloris lævibus aristatis. Spec. Pl. tom. 1. p. 436.

It is evident that this specific character requires some alteration, as it does not convey any accurate idea. I propose the following:

B. racemo simplicissimo erecto-patulo, pedunculis indivisis, spiculis ovatis sexfloris glabris.

In Usteri's Botanical Journal, No. VIII. p. 4. I have given

given a circumstantial description of this plant, and observed that it approaches nearest to *Bromus mollis* Linn.; and indeed Dr. Smith shows that he is of the same opinion, by assigning it a place immediately after, and comparing it with, *B. mollis*. The remark of professor Willdenow annexed to *B. racemosus*: "*Bromus gracilis*, n. 29, in multis, præter spicularum formam, cum hoc convenit," ought therefore to be omitted, as *B. gracilis* has no resemblance to *B. racemosus* L.

45.

BROMUS triflorus Sp. Pl. tom. 1. p. 436. is still to be considered as a dubious species; at least the synonym of Pollich should be cancelled: for the plant which this naturalist has described under the name of *Bromus triflorus* (*Hist. Palat.* 119.) is *Avena tenuis* Sp. Pl. tom. 1. p. 448. or *Avena dubia* Leers, (*H. Herborn. n. 89. tab. 8. f. 3.*) as is evident from the specimens gathered by Dr. Koch, in the places mentioned by Pollich.

46.

BROMUS madritensis Spec. Plant. tom. 1. p. 437. This grass, which is very common in the botanic gardens of Germany, has been often mistaken for *Bromus rubens* of Linnæus.—Another species which is nearly related to *B. madritensis*, and also found by professor Link in Portugal, is *BROMUS maximus*—*B. panicula densa nutante, spiculis oblongis, longissime aristatis hirsutis, seminibus planis dorso incurvis.*

B. diandrus panicula nutante, spiculis oblongis sexfloris longissime aristatis hirsutis: valvula corollæ exteriori bifido-setacea. *Roth. Bot. Abhandl. p. 44. n. 3.*

Gramen bromoides, locustis maximis, lanuginosum italicum. Scheuchz. Agrost. p. 261. Descriptio bona!

Flores prioris anni diandri, antheris fuscis, hinc ob autumnal
injurias

injurias imperfecti et steriles: posterioris anni omnes triandri, Antheris sulphureis.

It differs from *Bromus madritensis* Linn. as follows:

1. Its root, unless destroyed by intense cold, is biennial, not annual.
2. Radical leaves very large, forming (at least in our gardens) considerable tufts pubescently hoary.
3. Culms, in the cultivated plant, double or three times the length of those of *B. madritensis*.
4. Joints of the culm cylindrical, not annular.
5. The panicle is larger, closer, nodding; not upright-patent.
6. The stamens, in the wild and perfect plant, constantly three in number; not two, as in *Br. madritensis*.
7. The seeds oblong-lanceolate, compressed, flat at the back part, and curved in the middle; not oblong, nor upright, and semi-cylindrical.
8. The awns are of double the length of those of *B. madritensis*.

My *Bromus rigidus* *Catalecta bot. fasc. 1. p. 17.*—*Spec. Pl. tom. 1. p. 437.* might rather be added as a variety to *B. madritensis*, as it now appears to me from repeated comparison.

47.

BROMUS gracilis Sp. Pl. tom. 1. p. 438, (*B. sylvaticus* Smith Fl. Brit. 1. p. 136.), is found in the duchy of Bremen, almost constantly with hairy spikelets; whence these should not be mentioned in the specific character as *glabræ*.

48.

Between *Stipa capillata* and *Aristella* *Spec. Pl. tom. 1. p. 441*, insert:

STIPA elongata.—*S. aristis nudis rectis, calycibus semine piloso*

piloso longioribus, panicula divaricata nutante, foliis linearibus planis. *Roth. Catal. Bot. fasc. 1. p. 9.*

S. barbata foliis rigidis, hinc striatis : panicula laxa elongata : aristis longissimis, a basi ad apicem barbatis.

Desfont. Atl. tom. 1. p. 97. tab. 27 ?

Distinctissima a Stipa paleacea Spec. Plant. tom. 1. p. 441. foliis, panicula et aristis.

Habitat.

The only circumstance that leads me to any suspicion that Desfontaines' *Stipa barbata* may not be the same plant with mine, is, that he describes the *aristæ* as *barbatæ*, which in my *S. elongata* are merely *scabræ*.

49.

ARUNDO Karka calycibus unifloris nudis, flore subulato intus lanato mutico brevioribus, panicula secunda nutante. *Spec. Pl. tom. 1. p. 456.*

In this plant, neither the calyx nor the corolla is surrounded with hairs at the base, but the base of the germen, within the inner glume, is beset with hairs : hence it cannot be classed either with *Saccharum* or *Arundo*, and therefore deserves to constitute a new genus, which in my *Catalecta Botanica, fasc. 2. p. 2.* I have called *TRICHOON*.

50.

Between *Arundo Epigejos* and *Calamagrostis* *Spec. Pl. tom. 1. p. 456. insert*

ARUNDO stricta.—*A. calycibus unifloris, petalis lanceolatis glabris ; exterioris arista dorsali erecta, panicula coarctata spiciformi, culmo simplici. Dom. Timm. in literis.*

Habitat in Megapolitania. 4.

Differs from *Arundo Epigejos* in having an awned corolla ; from *A. Calamagrostis* in its simple culm, rougher panicle, in its outer petal being the length of the calyx, not double the length, and lastly in its shorter pappus.

51.

ROTTBOELLIA *filiformis* spica tereti-subulata subcompressa, erecta, gluma calycina bivalvi ensiformi patente. *Spec. Pl. tom. 1. p. 464.*

Professor Willdenow has altered, from a dry specimen, the specific character given to this plant in my *Catalecta Botanica*, fasc. 1. p. 21., attributing to it a two-valved patent calycine glume. This is correct in one respect; but it should be observed that in *Rottboellia filiformis*, as well as in *R. incurvata* and the two following new species, the calyx is patent during the time of flowering only, or when dried before the seed is ripe; at all other periods it is constantly closed, or pressed to the inner parts of the flower. By drying, the calycine glumes of *Rottb. filiformis* and *incurvata* shrink so considerably that they appear like two separate leaflets, though in their fresh and natural state they have but one calycine glume, divided rather more than half way down: a circumstance not unimportant in distinguishing the species of this genus. In order, therefore, more accurately to discriminate four very nearly related species, two of which are not yet enumerated in Willdenow's *Species Plantarum*, the specific characters should be as follows:

1. **ROTTBOELLIA** *incurvata*.—*R. spica tereti subulata subarcuata, gluma calycina subulata adpressa bipartita.*

Rottboellia incurvata. Spec. Plant. tom. 1. p. 463.—Smith Flora Brit. vol. 1. p. 151.

2. **ROTTBOELLIA** *filiformis*.—*R. spica tereti subulata subcompressa erecta, gluma calycina obtusa ensiformi adpressa bipartita.*

Rottboellia filiformis. Spec. Plant. tom. 1. p. 464.

3. **ROTTBOELLIA** *biflora*.—*R. spica tereti subulata erecta, calycibus bifloris bivalvibus: glumis obtusis adpressis margine scariosis.*

R. salina spica tereti stricta subulata, calycibus bivalvibus obtusis scariosis. *Sprengel Descr. Hort. Bot. Hall. II. p. 34. n. 45.*

Hab. in Hungaria ☉. Dr. Kitaibel.

Media quasi inter *Rotthoelliam incurvatam* et *filiformem*, tamen ab ambabus distinctissima.

Culmus debilis, pedalis et longior, filiformis, ramosus, ad nodos incurvus.—Folia linearia striata, scabriuscula, mucronata; vaginæ scabriusculæ; ligula ultra lineam longa, truncata, tenuissima.—Spica teres, palmaris, et longior, erecta, stricta, crassitie æqualis.—Calyx bivalvis, biflorus: glumis æqualibus, obtusis, adpressis, margine membrana nivea auctis, scariosis, rigidis.—Corollæ in quovis calyce binæ, hermaphroditæ, sessiles, bivalves; altera seriore paulo minore: valvulis subæqualibus, conniventibus, membranaceis, niveis, muticis: exterior ob- tusa; interiore acuminata.

4. *ROTTBOELLIA monandra*.—*R. spica tereti subulata erecta, gluma calycina univalvi indivisa minuta, flosculis aristatis.*

R. culmo erecto, floribus distichis spicatis. Cavan. Ic. Pl. n. 41. tab. 39. f. 1.

Gramen exile arundinaceum minimum acumine reflexum. *Scheuchz. Agrost. p. 41. tab. 1. fig. 7. K. (bona.)*

Habitat in Madriti vicinis, ubi etiam legit Cel. Schousboe. ☉.

A consimilibus facile distinguitur, 1. gluma calycina mi- nuta; 2. floribus aristatis monandris.

52.

Some errors have crept into the characters of *HORDEUM secalinum* and *maritimum* Spec. Pl. tom. 1. p. 475., which having originated in my *Flora Germanica*, I think myself bound to correct in this place.

In meadows near the sea and large rivers, more espe- cially in the duchies of Bremen and Oldenburg, a grass is

found that bears great affinity to *Hordeum marinum*, and is figured by Oeder under the name of *H. maritimum* in the *Flora Danica*, pl. 630., from which work I adopted the name. In England, however, there is another species of this genus that is only met with by the sea shore, and therefore has a better claim to the denomination of *maritimum*: the former being called *pratense* by the English botanists. These two species are confounded in the *Species Plantarum*, of which I was probably the cause, by having incorrectly quoted the synonym of Scheuchzer. As there are four other species very nearly related to these two, I shall here endeavour to settle them all, and to rectify their synonymy.

1. *HORDEUM marinum*.—*H. flosculis lateralibus masculis aristatis dorso glabris, involucris intermediis ciliatis lanceolatis.*

Hordeum marinum Spec. Pl. tom. 1. p. 474.

Flosculi intermedii involucri lanceolata, ciliata. Aristæ flosculorum omnium longitudine æquales.

2. *HORDEUM pratense*.—*H. flosculis lateralibus masculis brevius aristatis dorso hirsutis, involucris scabris setaceis. H. pratense. Hudson Fl. Angl. p. 56.—Hort. Kew. vol. 1. p. 119.—Smith Flora Brit. vol. 1. p. 156.*

H. maritimum. Roth Fl. Germ. tom. 1. p. 51. tom. 2. pars 1. p. 150. (excluso synonymo Scheuchzeri.)—Species Plant. tom. 1. p. 475. (exclusis synonymis omnibus.)—Schrader Spicileg. Fl. Germ. pars 1. p. 7. (excluso synonymo Vahl.)

H. spicis distichis, folliculo brevi, glumis calycinis scabris. Hall. Helv. n. 1538.

H. flosculis lateralibus masculis aristatis, calycum valvis setaceis. Gmelin Flor. Sibir. 1. p. 124.

Gramen spica secalina. C. Bauh. Prodr. p. 18.

Radix perennis.—Vaginæ foliorum præsertim inferiores hirsutæ. Ligula nulla, nisi margo vix observabilis.—

Spica

Spicâ hexasticha, fusco-viridis vel purpurascens.—Involucra omnia setacea, scaberrima.—Flosculi laterales brevius aristati, sæpius masculi et abortivi, rarius fertiles, lanceolati, dorso hirsuti: intermedius dorso glaber.

3. *HORDEUM secalinum*.—H. flosculis lateralibus neutris brevius aristatis, dorso glabris, involucris omnibus setaceis scabris.

H. secalinum. *Spec. Plant. tom. 1. p. 475.* (exclusis synonymis *Hudsoni et Halleri*.)—*Roth Fl. Germ. tom. 1. p. 51. tom. 2. p. 150.* (exclusis synonymis *Halleri, Buxbaumi et Bauhini*.)

Gramen secalinum spicatum minus. *Monti Gram. pag. 60. fig. 96. bona!*

Radix annua.—Vaginæ foliorum glabræ. Ligula brevissima ciliata.—Spica subdisticha, flavescenti-viridis.—Involucra omnia setacea, tenuiora, scabra. Flosculi omnes dorso glabri: laterales brevius aristati, constanter tenuissimi, filiformes, staminibus et pistillo destituti, hinc neutri: intermedius lanceolatus, hermaphroditus.

This grass, which appears to be rather scarce in Germany, has been supposed by most botanical writers to be the same with the foregoing species, whence it is difficult accurately to settle the synonymy. Haller's plant (*Hist. Helv. n. 1538.*) seems evidently to belong to *Hordeum pratense*, for he expressly mentions *spica hexasticha* in his description. But Scheuchzer's *Gramen spicatum secalinum minus* (*Agrostogr. p. 17.*) appears to be the same with *Hordeum secalinum*, since he attributes to it a stipule, and describes the lateral florets as half the length of the middle one. But whether the characters here given be sufficient to retain *Hordeum secalinum* as a distinct species, or that this ought more properly to be united with *Hordeum pratense*, I leave to the judgment of those who have an opportunity of comparing both these grasses with each other.

4. *HORDEUM maritimum*.—H. flosculis lateralibus massellis brevius aristatis, dorso glabris, involucri flosculorum lateralium interiore foliolo semiovato.

Hordeum maritimum. *Smith Flora Brit. vol. 1. p. 156.*—*Vahl Symbol. vol. 2. p. 25.*

Hordeum marinum. *Hudson Flora Angl. p. 57.*

This new species, of which Mr. Schousboe has transmitted me a fine specimen, is so nearly related to *Hordeum bulbosum*, according to the description given of it in the *Amœnit. Academ. vol. iv. p. 304.*, that I should scarcely consider them as distinct, had not Linnæus said of his plant: *Gluma exterior in omnibus flosculis longa, aristata: involucri basi subciliata*; which characters do not exist in *Hordeum maritimum*.

53.

Between *Triticum prostratum* and *pumilum* *Spec. Pl. tom. 1. p. 480*, is to be inserted:

TRITICUM squarrosum.—T. spica ovali squarrosa: spiculis distichis, calycibus trifloris patentissimis: valvulis calycinis corollinisque lineari-subulatis, scabris, rigidis.

T. *Bonapartei* spica truncata, spiculis distichis, calycibus trifloris patulis: valvulis calycinis corollinisque linearibus, acuminatis scabris, foliis involutis. *Sprengel Descr. Hort. Bot. Hall. II. p. 40. n. 50.*

Habitat in *Ægypto*. ☉. *Sprengel*.

Radix fibrosa.—Culmi plures debiles, diffusi, ad nodos infracti, filiformes, glabri, infra spicam piloso-glabriusculi: nodi oblongi, incurvi, parum elevati, nitidi.—Folia linearia, flaccida, mihi plana et per siccitatem vix involuta: Vaginæ glabræ, floralis laxior, ventricosa. Ligula ovata, obtusa brevis.—Spica uncialis et sesquiuncialis, ante inflorescentiam laxius imbricata compressa: florifera et fructifera autem squarrosa, ovalis, utrinque parum angustior. Spiculæ alternæ, distichæ, patulæ.

Calyx

Calyx bivalvis, triflorus, patentissimus; valvulis æqualibus, horizontalibus, rigidis, lineari-subulatis, conduplicatis, canaliculatis, extus scabris, margine tenui membranaceo einctis, in spicula una alterave spicæ infima plerumque sterili brevioribus, duas lineas vix superantibus; in reliquis quatuor lineas ad semiunciam fere longis.—**Corollæ** in quovis calyce tres, quarum intermedia minor, sterilis, bivalves, patulæ, divergentes: valvula exterior lineari-subulata, infra medium concava, subventricosa, supra medium conduplicata, setacea extus scabra, semiunciam circiter longa: valvula interior linearis duplo fere brevior exteriore, membranacea, ad marginem utrinque linea viridi elevata scabra costata, apice bidentata: dentibus subulatis, subæqualibus.

Stamina tria, exserta.—Filamenta tenuissima, membranacea; antheræ ovales, exiguæ, flavescentes.—**Germen** capitatum, fungiforme, capitulo albido, piloso, subanguloso, basi attenuatum, e viridi flavescent. **Stigmata** duo, exserta, plumosa.—**Nectarium** squamæ duæ, exiguæ, lanceolatae, germi extorsum basi adfixæ, membranaceæ, tenuissimæ.—**Semina** corollæ laxius vestita, oblongo subulata, basi parum ventricosa, extus convexa, scabriuscula, intus infra medium canaliculata: denudata linearia, fusca, utrinque obtusa.

Obs. Semina hujus graminis a viro Celeb. Sprengel accepi. Omnino distinctissimum a Tritico prostrato, a quo præsertim recedit: 1. Vaginis culmum arcte investientibus; nec laxis. 2. Ligula ovata, brevissima; nec oblonga, lineæ fere longitudinis. 3. Spica majore, squarrosa, persistente. 4. Spiculis patulis; nec compactis imbricatis. 5. Calycibus patentissimis, horizontalibus, scabris; nec adpressis, glabris.

54.

TRITICUM junceum calycibus quinquefloris truncatis, foliis involutis. *Spec. Plant. tom. 1. p. 480.*

X 4

On

On comparing the descriptions given by different botanists of what they have considered as this species, very few will be found to agree: some describing the sheaths as smooth, others as hirsute or tomentose; some the outer and inner valves as smooth, truncated, and without awns, others as rough, ciliated, acuminate, or even awned. Linnæus first characterized this species from a specimen in his collection (*Amœn. Acad. vol. 4. p. 266.*), adding only one synonym, namely *Gramen tritico spica mutica simile C. Bauh. Pin. p. 9. Prodr. p. 18. f. 17. Scheuchz. Agr. p. 7.*; but in the Mantissa, and the later editions of his Systema, he adds: *Gramen glaberrimum, vaginis foliorum tomentosus. Folia angustissima supra glauca. Spiculæ culmo adpressæ calycibus corollisque aristatis aut muticis.* The latter, however, contradicts his specific character; whence it is evident that Linnæus afterwards had before him a plant different from that from which he first framed the species. Reichard, so far from clearing up this difficulty, added some other synonyms, namely, *Triticum radice repente, &c. Hall. Helv. n. 1428.* and *Triticum radice perenni, spiculis solitariis, glumis calycum obtusis*, Gmel. Sibir. 1. p. 118. n. 54. neither of which can belong to it, since in both, the calycine glumes are described to be ciliated, those of the corolla as somewhat hirsute, sometimes acuminate and awned, sometimes without awns. Mr. Schousboe thinks that the *Triticum junceum* of northern Europe cannot be any thing but a variety of *Triticum repens*, acquiring quite a different habit on the sea-shore. I am entirely of the same opinion, and imagine that Linnæus was misled by such a variety when he added the above description to his *Triticum junceum*.

I have received under the name of *Triticum junceum*, either in plants or seeds, four different grasses, which I shall here submit to a nicer examination. From Mr. Timm I obtained specimens found by him near Warnemünde,
from

from which I made the description in my *Flora Germ. tom. ii. pars 2. p. 556.*; with this the descriptions of Dr. Smith and Mr. Schousboe perfectly agree; and as the former naturalist is in possession of the herbarium of Linnaeus, I have no doubt but that my plant and Mr. Schousboe's are the true *Triticum junceum* of the Linnean herbarium. Mr. Trentepohl afterwards communicated specimens to me, that were collected by him near Atngast, situated on a bay of the North Sea. These, though in their external appearance approaching near to *T. junceum*, still appear from their acuminate inner and outer glumes to be a variety of *T. repens*, with which also the description of Scheuchzer (*Agrost. p. 7.*) agrees. From two foreign botanists I have received seeds under the name of *T. junceum*, from which I raised two distinct plants, one of which I take to be a variety of *T. junceum*, the other a distinct species.

1. *TRITICUM junceum*.—*T. calycibus corollisque truncatis muticis, foliis demum involutis mucronato-pungentibus.*

T. junceum. Linn. Amoen. Ac. vol. 4. p. 266.—Roth Fl. Germ. tom. 2. pars 2. Addend. p. 566. (exclusa varietate).—Schousboe Marocco, pars 1. p. 52.—Smith Fl. Brit. vol. 1. p. 157.

β. giganteum culmo stricto.

Gramen angustifolium tritico-spica mutica simile. C. B.

Pin. p. 9. Prodr. p. 18. fig. p. 17.

Habitat in arenosis maritimis. 4.

Radix repens, articulata.—Culmus adscendens, superne nudus.—Folia linearia, acuminato-pungentia, supra striata scabra glauca, subtus lævissima, demum involuta: vaginæ striatæ, glabræ. Ligula brevis, truncata.—Spica palmaris, stricta, erecta.—Spiculæ remotiusculæ, distichæ, sessiles, muticæ, glabræ, 5- ad 8-floræ.—Calyx bivalvis, æqualis, glaber; valvulis truncatis extus convexis.—Corollæ valvula exterior calyci omnino conformis,

formis, mutica, obsolete emarginata: interior planiuscula margine ciliata.

β. giganteum.

Differt 1. Radice (in horto) fasciculata, nec repente.
2. Culmis 3- ad 5-pedalibus, strictis. 3. Foliis planis, ætate et siccitate tantum involutis. 4. Ligulæ loco margo politus, utrinque dente culmum amplexente notatus.

2. *TRITICUM repens*.—T. calycibus subulatis nervosis, corollis acuminatis, foliis planis.

Triticum repens. Linn. Spec. Pl. tom. 1. p. 481.—Roth Fl. Germ. tom. 1. p. 50. tom. 2. pars 1. p. 148.—Smith Fl. Brit. vol. 1. p. 158.

β. aristatum. Roth Fl. Germ. l. c. ubi synonyma.

γ. maritimum. Smith Fl. Brit. l. c. *γ*.

In var. *γ*. Folia glauca, rigida, linearia, primum plana demum involuta, mucronato-pungentia. Calyx acuminatus nervosus, carinatus; carina scabra. Corollæ valvula exterior acuminata et non raro in aristam brevem attenuata.

In this, as well as in the preceding species, the spikelets differ in the number of their flowers, according to the soil, from three to eight in a calyx; hence the number does not in these cases afford a character for distinguishing the species, and is to be omitted in the *differentia specifica*.

3. *TRITICUM fragile*.—T. spica tetragona, calycibus sexfloris muticis subacutis, corollis obtusissimis, foliis radicalibus planis tomentosis, culmeis demum involutis, caule fragili.

Triticum fragile. Roth Catalecta Bot. fasc. 2. p. 7.

Gramen maritimum spica loliacea, foliis pungentibus nostras. Pluk. Alm. p. 173 tab. 33. fig. 4. a. (bona.)

An? Festuca phœnicioides Linn. Mantiss. 33. Syst. Plant. ed. Reichard. tom. 1. p. 206. (Ob synonymon Pluknetii.)

Habitat

Habitat 4.

Statura *T. repentis*. Radix fibrosa, nec repens.—Culmi altiores, solidi, fragiles.—Folia linearia, rigida, remota, lineis depressis sulcata: radicalia constantè plana, villosa mollia; culmea media et superiora piloso-scabra, demum involuto-subpungentia et angulosa. Vaginæ striatæ: infimæ densissime tomentosæ; reliquæ glabræ, nitidæ, vix scabriusculæ.—Spica oblonga densa, tetragona. Spiculæ alternæ, distichæ, muticæ, compresso-planæ, ovatæ, plerumque sexfloræ.—Calyx æqualis: glumis carinatis, nervosis, glabris, subacutis.—Corollæ valvula exterior glumis similis, at duplo longior et latior, minus carinata, mutica, obtusissima, apice pilis brevibus barbata, margine tenuissime ciliata.

The synonym of Plukenet agrees very well with my plant, but is quoted by Dr. Smith under *Triticum junceum* (Flor. Brit. vol. 1. p. 157.), and by Linnæus under his *Festuca phœnicioides*, which is omitted in the new edition of the *Species Plantarum*. I should also have taken this species for *Festuca phœnicioides*, as the rest of the synonyms quoted by Linnæus mostly agree with my plant, but for his mentioning *spiculæ teretes* in the specific character.

55.

SCABIOSA stellata Spec. Plant. tom. 1. p. 554.

S. simplex of Desfontaines (Fl. Atl. vol. 1. p. 126. tab. 39. f. 1.) and of Schoushoe (Marocco, pars 1. p. 56.), does not seem to be distinct from *S. stellata*.

56.

GALIUM spurium Spec. Plant. tom. 1. p. 394. Here we find two plants confounded with each other; for that which the German botanists took with me for *Galium spurium*, is a new species of *Valartia* till lately unnoticed.

But

But my *GALIUM hispidum* (Fl. Germ. tom. 2. pars 1. p. 184.) is the true *spurium* of Linnæus, as has been satisfactorily proved to me by Baron Wulfen. This error was produced by the incorrect synonymy given by Linnæus and Reichard to *Galium spurium* and *Valantia Aparine*, and which I shall here endeavour to correct :

GALIUM spurium.—*G. foliis subsenis lineari-lanceolatis margine cauleque retrorsum aculeatis, pedunculis ramosis divaricato-patentibus, seminibus reniformibus lævibus.*

G. spurium *Lin. Syst. Veget. ed. Murray, p. 150.—Syst. Plant. ed. Reich. tom. 1. p. 301. (exclusis synonymis Vaillantii, Raii et Morisoni.)*

G. hispidum *Roth Flora German. tom. 2. pars 1. p. 184. (cum synonymis.)*

G. foliis serratis, petiolis divaricatis, seminibus rugosis *Hall. Helvet. n. 724.*

Aparine vulgaris *Rupp. Fl. Jen. p. 5. nota Halleri a.*

Caulis diffusus, ramosus.—*Pedunculi axillares, oppositi, ramosi plerumque trichotomi : fructiferi maxime divaricati. Flores omnes fertiles.*—*Semina reniformia, nigra, lævia, magnitudine seminis Sinapios albæ, primo intuitu glaberrima et nitida, ad lentem vero pilis brevissimis adspersa.*

The above character will enable every botanist to distinguish this plant from another with which, although there is indeed but little resemblance between them, it has nevertheless been frequently confounded, viz. *GALIUM spurium* of the German botanists and of *Flora Germanica*, and which, in his excellent *Flora Britannica*, is by Dr. Smith called *tricorne*. This is nearly related to *Valantia Aparine* L., and, as long as *Galium* and *Valantia* are separated, must be a congener of the latter, on account of the two, mostly sterile, lateral flowers, which therefore, as in *Valantia Aparine*, can only be considered as male flowers. :

1. *VALANTIA tricornis*.—V. pedunculis trifloris, floribus omnibus pedicellatis, fructu granulato, foliis suboctonis retrorsum aculeatis.

GALIMUM tricornis foliis suboctonis lanceolatis margine cauleque retrorsum aculeatis; pedunculis trifloris axillaribus, fructu granulato nutante. *Smith Fl. Brit. vol. 1. p. 176.*

Galium spurium *Linn. Syst. Veg. ed. Persoon. p. 155.—Spec. Plant. tom. 1. p. 594. exclusis synonymis Horti Upsal. et Halleri.—Roth Fl. Germ. tom. i. p. 66. tom. ii. pars 1. p. 578.—Schrader's Spicileg. Fl. Germ. 1. p. 18. tab. 1. f. 2.*

Galium foliis senatis serratis, petiolis trifloris incurvis. *Hall. Helv. n. 725.*

Aparine semine lævi. *Vaill. Paris. t. 4. f. 3. a. a.*

Aparine vulgaris. *Rupp. Jenens. p. 5. nota Halleri b.*

Caulis plerumque simplicissimus cum foliis et pedunculis retrorsum aculeatus.—Folia acuto mucrone terminata.—Pedunculi alterni, trifidi, triflori. Flores omnes pedicellati: laterales plerumque abortivi et masculi; intermedio hermaphroditico et fertili.—Pedicellus fructiger arcuato-reflexus, hinc fructus nutans.—Semina globosa, granulata seu tuberculis parvis exasperata, magnitudine seminis *Cannabis* vel *Pisi* minoris.

2. *VALANTIA Aparine*.—V. pedunculis trifloris, floribus masculis lateralibus breviter pedicellatis, hermaphroditico-sessili, fructu tuberculis exasperato, foliis suboctonis, antrorsum aculeatis.

Valantia Aparine. *Linn. Syst. Pl. ed. Reich. tom. iv. p. 319. (exclusis synonymis Halleri et Vaillantii.—Roth Fl. Germ. tom. i. p. 430. tom. ii. pars ii. p. 548. (excluso synonymo Rupprii)—Schrader Spicil. Fl. Germ. 1. p. 55. t. 1. f. 3.*

Aparine semine *Coriandri* saccharati *Parkinsonii.* *Vaill. Paris. tab. 4. fig. 3. b.*

Caulis

Caulis ramosus, diffusus, cum pedunculis retrorsum aculeatus.—Folia margine antrorsum aculeata, obtuso mucrone terminata.—Pedunculi triflori: floribus lateralibus sterilibus, masculis, brevissime pedicellatis; intermedio hermaphrodito sessili.—Pedunculus fructiger apice arcuato-reflexus.—Semina globosa, tuberculis densis evidentioribus, magis quam in antecedente, exasperata.

57.

Between *Plantago patagonica* and *albicans* *Spec. Pl. tom. 1. p. 645. n. 12. 13. insert:*

PLANTAGO pilosa: P. foliis lineari-lanceolatis pilosis trinerviis integerrimis, scapo tereti-pilosissimo, spica elevato-oblonga squarrosa, bracteis linearibus rigidiusculis patentibus. *Roth's Catalecta Bot. fasc. 2. p. 10. t. 1.*

Hab. in Hispania? ☉.

58.

After *Plantago Cornuti* *Spec. Plant. tom. 1. p. 649. n. 26.* is to follow:

PLANTAGO villosa: P. subcaulescens, foliis lineari-lanceolatis obsolete trinerviis subdenticulatis villosis-canescens, pedunculis filiformibus teretibus, spica ovata subrotunda, bracteis alatis carinatis flore brevioribus. *Roth Catal. Bot. fasc. 2. p. 11.*

P. scapo erecto tereti, foliis lineari-lanceolatis integerrimis villosis obliquis, spica ovata. *Moench Method. Plant. p. 459.*

A *Plantagine albicante* L. recedit, 1. Radice fibrosa, annua; nec perenni. 2. Caule brevi, declinato, subcompresso. 3. Foliis obsolete trinerviis, versus apicem denticulatis. 4. Spica ex ovato-subrotunda; nec cylindrica.

59.

According to Mr. Schousboe's observation, the synonyms of *Plantago afra* and *Psyllium* of Linnæus are incorrect;

correct; that given to the former belongs to *P. Psyllium*, and that of the latter to a new species. The three are thus distinguished by Mr. Schousboe:

1. *PLANTAGO afra*. *P. caule ramoso fruticoso, foliis lanceolatis dentatis, capitulis aphyllis. Spec. Pl. tom. 1. p. 652. (exclusis synonymis omnibus excepto Houttuini.)*

2. *PLANTAGO Psyllium*: *P. caule ramoso herbaceo, foliis planis trinerviis dentatis, capitulis aphyllis. Schousboe Marocco, 1. p. 67.*

P. Psyllium. Spec. Plant. tom. 1. p. 650. (exclusis synonymis Bauhini, Dodonæi, et Tabernæmontani.) Desfont. Pl. Atlant. 1. p. 140.

Psyllium Dioscoridis, vel indicum, foliis crenatis. C. Bauh. Pin. p. 191.—Prodr. 99.—Moris. 3. p. 262. S. 8. t. 17. f. 4.—Psyllium laciniatis foliis. Boccone Sic. 8. t. 7. A. B.

3. *PLANTAGO stricta. P. caule ramoso herbaceo erecto, foliis linearibus canaliculatis integerrimis, capitulis aphyllis. Schousboe Marocco, pars 1. p. 69.*

Herba pulicaris 1. Tabernem. ic. 145.—Psyllium Dodon. Pempt. p. 116.—Psyllium majus erectum. C. Bauh. Pin. p. 191.—Psyllium annum majus, foliis integris. Moris. iii. p. 262. S. 8. t. 17. f. 2.

Habitat in agris circa Mogadore. ☉.

Differt a *Plantagine Psyllio*, cui similis, 1. Foliis angustioribus, longioribus, constanter integerrimis, canaliculatis, unicostatis; nec dentatis, planis, trinerviis. 2. Spicis minoribus et rotundioribus. 3. Bracteis et calycis laciniis magis carnosius, præsertim apice crassioribus.

60.

Between *Echium violaceum* and *maritimum* *Spec. Pl. tom. 1. p. 788.* insert two new species:

1. *ECHIMUM tenue*: *E. caule erecto tenui cum foliis lanceolatis piloso-strigoso, corollis inæqualibus, staminibus corolla brevioribus. Roth. Catalecta Bot. fasc. 2. p. 16.*

E. micranthum

E. micranthum staminibus corolla brevioribus, calyce limbum æquante, foliis lanceolatis strigosis. *Schousboe Marocco, pars 1. p. 75.*

Hab. in arvis provinciæ Hahæ.

Caulis erectus, tenuis, ramosus.—Folia lanceolata, utrinque attenuata.—Racemus in caule ramisque terminalis, densus, spicatus, secundus.—Bracteæ lineari-lanceolatæ, alternatim laterales. Calycis laciniae lineari-lanceolatæ, subæquales.—Corolla amœne cœrulea, albo-striata, extus pubescens, in spontanea planta calycis longitudine; in culta calyce duplo fere major: tubus limbo duplo brevior: limbus obliquus inæqualis. Stamina inæqualia longitudine tubi corollæ.—Stylus longitudine fere corollæ.—Tota planta, exceptis corollis, piloso-strigosa.

2. *ECHIUM parviflorum*: *E.* caule erecto dichotomo, foliis caulinis ovali-oblongis, corollis subæqualibus, calycem vix superantibus, genitalibus corolla duplo brevioribus. *Roth Cat. Bot. fasc. 2. p. 14.*

E. parviflorum *Mœnch Method. Plant. p. 423. (excluso synonymo Linnæi β.)*

E. annuum, folio *Lithospermi arvensis* flore parvo. *Boerhaave Lugd. 1. p. 134. n. 11. secundum Mœnch.*

Habitat ☉.

Caulis erectus, a basi ramosus, dichotomus.—Rami patuli, remoti, longitudine caulis.—Folia obtusa: radicalia ovalia; caulina et ramea, ovali-oblonga; floralia lanceolata. Racemus laxis, secundus.—Calycis laciniae lanceolatæ, subinæquales.—Corolla pallide cœrulea, vix calycem superans; extus angulosa et pilosa: limbus subæqualis, subplicatus.—Stamina inæqualia, recta, tubum corollæ parum superantia.—Stylus longitudine staminum, erectus strictus, pilosissimus.—Tota planta tuberculis exiguis, ætate albis adspersa, exceptis corollis, piloso-hispida.

[To be concluded in our next.]

XXI. *Memoirs of the Life and Botanical Travels of ANDRE MICHAUX, by DELEUZE**.

WE are indebted for the greater part of the vegetable productions which enrich our fields and gardens to efforts of industry. Our garden vegetables and fruits are the natives of various countries, and in their natural state were very inferior to what we see them in our cultivated lands. Indefatigable researches have successively discovered them in their native soil; and after being imported and improved by culture, commerce has spread them from one country to another. After various experiments, choice has been made of the kinds that are most productive, or most suitable to the climate into which they were introduced; and many districts, where the inhabitants could scarcely find food in former times, now present abundant harvests to a numerous population.

Of about 250 kinds of trees, which are at present found in France, more than three-fourths are natives of foreign soils. Among these exotics many afford delicious fruits; many are employed in building and the other useful arts; and others serve to ornament our parks and gardens, and present us with the picturesque views of the most favoured countries of the globe. The walnut-tree comes from Pontus; the cherry from Cerasonte; the olive from Athens; the almond-tree from the East; the peach from Persia; the mulberry from China; the fig from Syria; the apricot from Armenia; the pomegranate from Carthage; and the orange from India. It is the same with our herbaceous plants. It is unknown from what country corn was originally derived; but many of our best culinary and agricultural vegetables are natives of Asia. The discovery of America has furnished

* Annales du Muséum d'Histoire Naturelle, xvme cahier.

us with maize, which constitutes the principal nourishment of various parts of our continent ; and the potatoe, which has augmented the population of Ireland and Switzerland, and in the north of Europe is a resource of such great importance to the nourishment of man ; together with a prodigious number of useful trees, such as the acacia, the tulip-tree, several firs, the ash, the maple, &c.

This part of our wealth may still be greatly increased ; but we must not rely, for all the advantage of this kind that may be acquired, on the efforts of traders, who bring only such trees or vegetables as they meet with on the coasts, and in the ordinary pursuits of their commerce. To derive all the benefit which this inexhaustible wealth offers, we must have men of study and science, who will penetrate into the interior of the countries they visit, and can distinguish the productions that are most useful.

We have pursued these reflections to demonstrate how much we owe to those courageous men, who, for the service of civilized society, have renounced all its enjoyments to search for the undiscovered treasures of nature in savage or uninhabited countries. Nor are these reflections foreign to our present subject : he of whose life we are about to give some account, well deserves to be placed among the benefactors of the human race. In tracing the picture of his laborious life, we shall see that the most ardent passion for the sciences, and above all for that of agriculture, united to the most constant love for his country, inspired him with the noblest plans, and endowed him for their execution with that intrepidity which braved dangers, and that strength and vigour which resist fatigue and surmount obstacles.

André Michaux was born at Satory, a royal domain situated in the park of Versailles, on the 7th of March 1746. When ten years old he was sent to a boarding-school with his younger brother, but neither of them remained there more than four years. Their father, whose intention it was that
they

they should succeed him in the management of the farm at Satory, of which he had the care, deeming it unnecessary that they should pursue their studies further, sent for them home, and applied himself to the giving them an early habit of rural labours, and an early relish for the simplicity of that way of life.

The young André, whom nature had endowed with an extraordinary activity of disposition, soon acquired the most decided taste for agriculture. He closely examined the various vegetable productions within his reach; carefully explored the gardens; made incessant experiments; and, ambitious of uniting theory with practice, gave all his leisure time to the study of the principles of his art.

He lost his father in 1763, and his mother in 1766. Being now the depositary of the fortunes of his sisters, he divided the care of the farm with his brother till the year 1769, when they separated their concerns and pursuits. During this interval he had studied the elements of the Greek language, and improved himself in the Latin tongue.

In October 1769 he married Cecilia Claye, daughter of a rich farmer of Beauce, who died in September the following year, after having borne him a son. This loss plunged Michaux in the deepest despair. M. le Monnier, being informed of the circumstance, conceived the most tender interest in his concerns, frequently inviting Michaux to visit him at his garden of Montreuil, near Versailles. This celebrated man, in such high repute at court, solaced his leisure hours in conversation with Michaux, whose melancholy he laboured to subdue by engaging him in the study of botany, and of the principles of naturalizing foreign vegetable productions. The farm of Satory consisted of 500 acres, and le Monnier advised Michaux to dedicate a portion of it wholly to experiments; which plan was adopted: he sowed madder and rice (*ris nu*), that perfectly

succeeded. M. le Monnier then introduced him to M. d'Angiviller, who engaged him to make trials of the culture of the teff of Abyssinia, an excellent pasture grass, of which Bruce had furnished the seed. The manner in which he executed this commission added much to the favourable idea that had been entertained of him.

He continued, notwithstanding these labours, to be still a prey to his grief, the remembrance of the beloved object he had lost being incessantly recalled by every scene around him. A passion for travelling, which he had entertained from his earliest years, was naturally increased by this state of mind. I remember to have heard him say, that having construed Quintus Curtius when he was fourteen, that author's descriptions of the countries conquered by Alexander so inflamed his imagination, that from that period he had almost constantly sighed for the happiness of travelling over the eastern world.

This strong impression was never afterwards destroyed by his advancement in years: it was merely subjected to the calm examination of reason, whence it was no longer a vague desire of exploring new countries. In quitting an abode become too painful to him, he entertained the honourable ambition of rendering services to his country. To this end he formed the resolution to travel into countries little known, situated in a climate analogous to that of France, to collect their productions, and naturalize them in his native soil. Perceiving, however, with an ingenuous feeling, that he had not yet attained sufficient knowledge to travel with the utmost prospect of success in his scheme, he resigned his farm in favour of his brother, and gave himself up to study with renewed ardour.

In 1777 he established himself at Trianon, to study botany under Bernard de Jussieu, to whom M. le Monnier had recommended him; and in 1779 he removed to Paris, and

and took a lodging in the neighbourhood of the *Jardin des Plantes*, to improve himself in the knowledge of various parts of natural history.

These studies being finished, his next idea was, that the profession of one who travels in the prosecution of any great object of science, required, like every other profession, a particular apprenticeship; and that it would be profitable still further to practise the science in countries where important aids were to be obtained, previous to the penetrating into countries unknown or uncultivated. He therefore first visited England. The English at that time were almost the exclusive cultivators of exotic plants and trees. Michaux was enraptured at the sight of their collections, and on his return to France brought with him a great number of trees, which he planted in the gardens of M. le Monnier, and the Marshal de Noailles, where they perfectly succeeded. Frequently also he took from these gardens a bundle of cyons, and traversing the woods of Versailles engrafted a number of trees, using a method that was peculiar to himself.

In 1780 he made an excursion on the mountains of Auvergne, with several botanists, among whom were M. de la Marck and M. Thouin, by whom we have been informed, that as soon as they had quitted the place in which they had passed the night, Michaux, armed with a fowling-piece, and carrying a haversack, a port-folio, and several tin boxes, always advanced before them, rapidly climbing the mountains. He carried in his pocket seeds of the cedar of Lebanon, which he sowed in places favourable to its growth. He was frequently seen at a distance, halting and conversing with the shepherds; was now and then heard to discharge his gun; and in the evening he was found at the place of rendezvous, laden not only with a collection of plants, but with birds, minerals, and insects.

Soon after his return from the mountains of Auvergne,

he proceeded to traverse the Pyrenees, and passed into Spain ; from which tour he returned with seeds, that were distributed to different gardens, and experimental botanists.

He then addressed himself to M. le Monnier, requesting him to obtain a commission for him to travel into countries where he might find new objects of his science. This gentleman readily promised him to seize the first opportunity, which soon presented itself. M. Rousseau, a native of Ispahan and nephew of the celebrated Rousseau of Geneva, arrived at Paris, having been recently appointed consul of Persia: Michaux was pitched upon to accompany him; and Monsieur, the king's brother, assigned him a pension of 1200 livres. Our traveller made no complaint of the insufficiency of the sum : he fitted himself out at his own expense, and departed with the consul in 1782. They proceeded first to Aleppo*, and

* I here add an extract of a letter from Michaux to M. Thouin, which appears to me sufficiently interesting to be preserved:

" My dear Sir,

Aleppo, July 30, 1782.

" I landed at Alexandretta on the 30th of March. I cannot express to you the delight with which I run over the country here. In examining the multitude of plants with which the fields abound, I was often transported beyond myself, and compelled to pause and tranquillize my mind for some moments. At night I could not sleep, but watched the dawn of day with impatience. What happiness! to find myself in Asia, and at my pleasure to traverse the mountains and valleys covered with liliaceous plants, orchideæ, daphnes, laurus, viticæ, myrtles, andrachnes, styrax, palms, and other vegetable productions, different from those of Europe. The sea-shore abounded with shell-fish, varied in form and colour : land and sea birds came every morning to feed upon them. The flamingos came in flocks of three and four hundred each. The marshes abounded with reptiles. Unfortunately the greater part of the plants were not yet in flower ; and the mountains were infested by the Bayas, who the preceding year had pillaged the caravan of Alexandretta, and a few days before our landing had put to flight the troops sent to guard the town, and had burnt several of the houses.

" Since my arrival at Aleppo, I have made two tours among the mountains,

and thence to Bagdad, where they arrived after a journey of 40 days across the desert. At Bagdad Michaux quitted the consul. He traversed those countries, formerly so flourishing, at present so devastated, which are situated between the Tigris and the Euphrates, to proceed to Bassora, where he remained for some months to acquire information respecting the country, and to perfect himself in the Persian language,

ains. The town is situated on the side of a valley, in which are gardens abounding with trees, none of which are grafted: the rest of the country is dry, stony, and uncultivated. For six leagues round, not a single tree or shrub is to be seen. Beyond are vast plains, whose fertility, if cultivated, would be prodigious. On these were formerly villages, which have been successively destroyed. The predecessor of the present pacha destroyed more than eighty, on the pretext that the inhabitants had formerly revolted. His soldiers committed unheard of cruelties among them. They ransacked the houses, and cut off the heads of women and children, to make themselves masters of the pieces of gold which ornamented their head-dresses. It is by such vexations that the pachas indemnify themselves for the tributes they pay to the grand seignior. These ruined villages are at present the haunts of robbers.

“Excursions are equally painful and dangerous throughout the whole of this part of Asia, which extends from Syria to the frontiers of India. The traveller carries his provisions, and sleeps on the ground, avoiding the caravanseras on account of their filthiness and the insects with which they abound. He must, however, follow the caravans; otherwise he would be plundered by the Arabs on the plains, and the Curdes who infest the mountains. The caravans are often attacked: in March last the robbers took from that of Alexandretta 380 camels; and the one which is now ready to depart has been compelled to wait ten days beyond their time, expecting troops which the pacha of Aleppo and Antioch has detached for their escort. Every traveller must take with him an Armenian, with whom he must watch alternately; for the conductors of the caravans are for the most part knaves, who watch an opportunity secretly to rob the traveller.

“While I am waiting for our departure from Bagdad, which will not take place in less than a month, I purpose to make a botanical excursion over 150 leagues. I shall pass by Laodicea, Antioch, and Seleucia: I hope to find medals in this last city. At my return I shall send you and M. de Malesherbes some specimens of seed. The consuls and merchants can tell you that no one labours with more ardour to make his fortune, than I do for the interests of botany.”

of which he compiled a dictionary that forms a large volume, now before me.

Persia was at that time a prey to civil wars, and the Arabs laid waste the frontiers. Michaux endeavoured to enter by Busbeer, a port of the Persian gulf; but he was taken and plundered by the Arabs, who left him nothing but his books. Stript of all that he possessed, and without resources, he was at a loss to what quarter he should turn himself, when he was claimed by Mr. la Touche, the English consul at Bassora. Although peace was not yet concluded between England and France, Mr. la Touche justly thought that a naturalist who travelled for the benefit of mankind, ought to be protected by every nation; and he generously furnished him with the means of pursuing his journey. Michaux succeeded in an attempt to gain Shiras, whence, after remaining some time, he proceeded to Ispahan. From Ispahan, exploring mountains and deserts, he employed two years in traversing Persia, from the Indian Sea to the Caspian. In this expedition, he found that the provinces situated between the thirty-fifth and the forty-fifth degrees of latitude are the native countries of the greater part of the trees that enrich our fields and gardens. The walnut, the cherry-tree, the vine, the spelt, lucerne, sainfoin, the chick pea, onions, lilies, tulips, &c. grow naturally in those countries. He also acquired information on the culture of the date; and established a very curious fact, already mentioned by Kæmpfer, which is, that the male flowers of the date, although kept a year, are still proper to fecundate the female*.

Although botany was his principal object, he did not neglect whatever might be interesting to the other branches of science.

* See a memoir of Michaux read at the National Institute on the 6th of Floreal, in the 7th year, and printed in the *Journal de Physique, Floreal, an ix.*

We are indebted to him for a very curious monument in perfect preservation, found at one day's journey below Bagdad, among the ruins of a palace known by the name of the garden of Semiramis, near the Tigris, which is now in the cabinet of antiquities in the national library. It is a stone in the form of a pear, a little flattened on two sides, a foot and a half in height, and a foot broad, weighing 44 pounds. It is ornamented with carving on the two flat sides: on the upper part are various symbolic figures, and below is a long inscription on two spaces, one of 25, and the other of 26 lines. The illustration of this monument, which M. Millin published in his *Monumens Antiques*, vol. 1. p. 58. has given rise to much discussion, but we are still confined to conjectures on this subject.

It is difficult to conceive how Michaux could effect so many important objects with such feeble means, in a country disturbed by war, infested by hordes of robbers, where it was necessary to travel constantly armed, frequently to join the caravans, in order to proceed from one country to another, sometimes to fly before the robbers, and at others to put them to flight by a vigorous resistance.

His character is peculiarly displayed in the notes of his journal. Relating a voyage which he made in a boat on the Tigris, he laments that he was not able, while the boat lay-to during a few hours, on some occasion, to botanize on the neighbouring shore. "The Arabs," says he, "had taken away my shoes, and the soil was so scorching that it was impossible to place my feet except where the water covered the shore." In speaking of his circumstances, the only loss with which he appeared to be affected, was that of a favourable opportunity of pursuing his researches.

Michaux returned to Paris in the month of June 1785, bringing with him a magnificent collection of plants and seeds. We are indebted to this expedition for many vegetables

tables at present successfully cultivated in the gardens of the amateurs, such as *Rosa simplicifolia*, *Zoegea leptaurca*, *Michauxia campanulata**, &c. He was received by men of science with peculiar distinction, who alone were capable of appreciating the merit of a man who sought not to display his own admirable qualities. They thought that the services which he had rendered the country, and the sacrifices which he had made, merited a national recompense : but Michaux demanded only to be sent on a new journey. He wished to return to Asia to visit the countries on the east of the Caspian Sea, and afterwards to proceed to Thibet and the kingdom of Cashmere, whose productions are little known, and where there exist objects of commerce and manufactures which he was desirous of introducing into France. His solicitations were fruitless : yet the government, anxious to enrich France with various trees which grow in North America, selected him for this commission, and he departed on the 1st of September 1785.

He was charged in his instructions to proceed through the United States, for the purpose of collecting seeds, trees, shrubs and plants, and to establish a magazine for them in the neighbourhood of New York, whence they were to be sent from time to time to France. The park of Rambouillet was destined to receive them ; it being the design of government to make one large central collection, whence the trees, &c. might be distributed. He was enjoined not to send them to any other quarter, with the exception of two packages, allowed to be sent, annually, to M. le Monnier, and two to the *Jardin des Plantes*. He was

* It was M. l'Heritier, who, in publishing the figure and description of this genus, has consecrated it to the memory of M. Michaux. The name of *Michauxia* has been adopted by Messrs. Aiton, La Marck, and Ventenat ; and M. de Jussieu proposes to adopt it also in the new edition of his *Genera Plantarum*.

also instructed to send game from America, which might be naturalized in plantations of trees, natives of their own country.

Michaux arrived at New York in 1785, in which city he fixed his principal residence during nearly two years, and established a garden in the neighbourhood. During this time he traversed New Jersey, Pennsylvania, and Maryland; and in the first year sent twelve parcels of seeds, 5000 trees, and several Canada partridges, which multiplied greatly at Versailles.

In September 1787 Michaux departed for Carolina.—Regarding Charlestown as a central point, from which he might make his southern and northern expeditions, and visit the chain of the Allegany mountains, he resolved to make that city his principal residence; and accordingly purchased a piece of ground, three leagues from the town, destined to be a nursery for the seeds and young plants collected in his excursions, intending to send to France such only as should thrive well, and were therefore preferable to those found in the woods. Whilst he made his excursions into the country, he left his son at Charlestown to superintend the culture of his nursery. He paid such attention to the art of packing to the best advantage, that he sent to France, in one case, several hundred trees, which arrived in perfect health, and in the utmost freshness. Every package was accompanied by instructions respecting the culture proper to each species of tree, and the various uses to which it was adapted. The correspondence on this subject was between him and the Abbé Nolin, director of the plantations.

In the month of April he departed on an excursion to examine the country near the sources of the Savannah, where he discovered *Magnolia auriculata*, *Azalea coccinea*, a new *Kalmia*, *Rhododendrum minus*, *Robinia viscosa*, various oaks, and several trees which, though not
unknown

unknown to the botanists, had not yet been cultivated in our gardens.

Michaux, encouraged by these discoveries, resolved to extend his excursions to the very summit of the Allegany mountains. He therefore formed connections of friendship with the Indians, among whom he chose new guides, paying them part of their wages in advance, and promising them further gratuities on their return. Thus prepared, he ascended with his guides the rivers that fall into the Savannah.

In these uninhabited countries the forests are almost impenetrable, there being no other tracks than those formed by the bears. The bed of the torrents is the only route that can be followed : these must often be forded, or traversed on the trunk of a tree thrown across. On the banks the traveller meets in some places with marshes in which he may sink, in others with thorny spreading plants : for sustenance there is nothing but the uncertain produce of the chase, or some harsh fruit accidentally met with. Michaux had lost two of his horses, and the third he reserved to carry his collection ; and had he been ever furnished with provisions, the savages had not sufficient command of themselves to manage the stock with prudence. In their honesty he placed much confidence, of which he had never reason to repent ; but he was often annoyed by their want of tractability. It was absolutely necessary not to lose sight of them ; and he was even sometimes compelled to run, that he might not be separated from them. In the end he acquired all their boldness. Of all the Europeans they had known, they avowed that he had the most sense. “ The people of your country,” they would say, “ are very ignorant : they do not know how to live in a forest ; and, if they lose themselves in it, cannot find their way out.”

When Michaux found a spot suitable to his purpose, he cut down the branches of trees, and constructed a little cabin.

cabin, whence he made excursions in the neighbourhood ; returning at night to his shelter, where he deposited the selections of the day. His Indians every morning proceeded to the chase, and returned in the evening to kindle their fire and cook their game. It deserves to be noticed here, that they did not roast, but boiled all their animal food : it is more agreeable to the palate roasted ; but when it is to be eaten without vegetables, after a few days, it inflames the blood.

I will not here describe the dangers which our traveller incurred in these solitudes, where he was incessantly engaged in climbing rocks, or passing torrents ; often upon the rotten trunks of trees, which crumbled beneath his feet ; where a frightful darkness rests over the wilds, produced by the thickness of the branches interwoven with climbing plants, and still more by almost continual fogs, which cover these rugged mountains.

Michaux had found a new species of *Pavia*, of *Clethra*, of *Azalea*, of *Rhododendrum* ; and thus animated by an enthusiastic love of his science, he did not even think of fatigue. Being arrived at the sources of the river Tennesse, on the other side of the mountains, he found a delightful plain of a mile in extent, covered with delicious strawberries, of which he collected roots that have perfectly succeeded in France.

This was the extremity of his present excursion. He returned to Charlestown, where he arrived on the 6th of July, after having travelled 300 leagues across Carolina and Georgia. It was in the south of this latter province that he gathered a species allied to *Cinchona*, which is used by the inhabitants of the country as a cure for fevers, and which with us may probably be very serviceable in medicine. This tree, which he has distinguished by the name of *Pinkneya pubens*, is hardy enough to bear the winters of
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our southern departments. It is at present cultivated in the garden of M. Cels, and in that of the museum.

In the following autumn Michaux formed the design of visiting Spanish Florida, and, having obtained passports from Señor Lespedez, the Spanish governor, proceeded to St. Augustin, where he arrived in February 1788, with his son, and a negro who was particularly attached to him. The governor, to whom he was announced as a botanist travelling for instruction in his science, did not however give him his permission to penetrate into the country without a long examination; but a few days after, having learnt that, on the covers of letters sent to Michaux from Charlestown, he was styled botanist to the king of France, he treated him with much respect, and offered him an escort for his excursions.

We may readily suppose that this offer made no change in the plans of our traveller. He remained at St. Augustin till the 12th of March, to explore the productions of the neighbourhood, and to acquire information respecting the interior of the country, which is at present absolutely uninhabited. Having hired a guide, he repaired to the mouth of the Tomaco, where he bought one of the canoes used in the navigation of those rivers. These canoes, formed of the hollowed trunk of the *Cupressus disticha*, are twenty-two feet in length; but they are scarcely three feet round the bottom, and only two and a half in depth. Two persons cannot sit abreast in them, but one seats himself behind the other. Michaux, his son, his negro, and their guide, were placed in this order in their long vessel, there still remaining a large space for the reception of plants. They rowed by turns, and, thus mounting the river, explored the creeks. Michaux keeping his eye upon the shore, when he saw an interesting spot, fastened his canoe, landed, and made excursions to a considerable distance.

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He was in a climate very different from those he had traversed the preceding years. Here the orange-tree grew with scarcely any care, and even the sugar-cane had been cultivated some years before. But the voyage was not the less painful; frequently in the creeks there was not sufficient water to float the canoe, and they were then obliged to roll it along upon the trunks of trees, and to carry the baggage with which it was laden. He was compelled to live on fish, and the oranges he found in the woods. These oranges, though not sweet, never incommoded him. He afterwards entered the river St. John, and in five days arrived in Lake St. George, into which there falls another small river, which he also ascended, not without being frequently compelled to roll the boat in the manner before described. This river, which is very deep, and abounding with fish, presents a singular phenomenon: its waters have a detestable taste, are of the colour of brimstone, and yet so clear, that the smallest branches of trees that have been sunk may be seen at the bottom. It rises in a lake in which there are various jets d'eau of fifteen or eighteen inches. On its banks he found an *Illicium* with a yellow flower, the perfume of which was equal to that of the Chinese one, and which may be put to the same uses.

This excursion occupied five weeks. In his journal he observes, that he found it very convenient and agreeable, because, not being compelled to resort to horses, he had no fear of his collections going astray. This trait shows that he estimated fatigue as nothing. When he took his leave of the Spanish governor, he presented him with a box of seeds for the garden of Madrid. He proceeded to Savannah by the lakes, notwithstanding the danger of being attacked by the Creek Indians, who were at that time at war with the Anglo-Americans. From Savannah he returned by sea to Charlestown. The *Illicium* arrived in a healthy condition; and this new species, preferable to that found

found near Pensacola, was soon spread round the neighbourhood. Michaux supposed that, if it were cultivated on a large scale in South Carolina, it would amount to no more in France than eighteen sous per pound.

Returned to his garden at Charlestown, he enriched it with new plantations, from which he sent large packages to France. He had established correspondents in every place that he had visited, sending to the inhabitants European seeds and plants in exchange for such of the vegetable productions of the country as he chose ; which he had previously pointed out to his agents, with directions for the proper season of gathering them. He travelled generally from the month of April to October ; and during his absence two gardeners and a negro, whom he had instructed in the art, cultivated his garden, and carefully gathered his seeds. In winter he made shorter excursions, to collect a few young trees, in places which he had noticed in the summer season.

Although the temperature of the Bahama Islands, and that of the Lucayas, differ too much from that of Europe to permit of the naturalization of their productions in France, the desire of giving a complete Flora of North America, from the tropic to Hudson's Bay, induced Michaux to visit them. He arrived at New Providence on the 26th of February 1789, where he was well received by the governor of the colony, to whom he presented seeds to be sent to Sir Joseph Banks. In these isles he collected 680 trees and shrubs, and prevailed on the governor to introduce into them the culture of the vine and date, which from the nature of the soil he saw would succeed there, promising to send him some young plants of the date : and it will be readily supposed that he kept his word. He sent also young plants of the same to St. Augustin, where there had long been a female date forty feet high, which for want of a male could not bear fruit.

On his return to Charlestown on the first of May 1789, Michaux first learned the events which then agitated France. He now found great difficulty in receiving the funds necessary to his expenses ; and supposing that he should soon be recalled, he seized the opportunity to visit the highest mountains of Carolina. Departing on the 30th of May, he proceeded to Morganton, a village situated a hundred leagues from the coast, where he took a guide, with whom he plunged into the forests. At several days' journey from every habitation of man, the guide, having thrown himself upon a bear which he had brought to the ground, was severely wounded, and was in danger of being killed. Michaux takes this occasion to observe that in these solitudes it is essential to have two guides, there being various accidents by which one may perish, and it would be almost a miracle for an European to find his way back alone. He cannot follow the bed of the torrent, interrupted by prodigious falls, the banks of which are precipices of rocks, undermined by the waters, which, giving way under the feet, precipitate the traveller into the stream. If he climb a mountain to descry the nature of the country, he perceives nothing as far as the sight extends but the summits of similar mountains, with intervening plains, covered with *Rhododendron*, *Kalmia*, and *Azalea* ; above which large trees, here and there, rear their lofty heads. These woods are impenetrable to an European : the Indian alone is able to discover tracks ; the former having no conception how he is to direct his course in these immense wilds.

This excursion, which Michaux made with his son, occupied less time than he had dedicated to it ; for, the Indians having at that time a dispute with the inhabitants of Virginia, an European incurred the hazard of being massacred. He therefore returned to New York, and thence to Phila-

delphia and Charlestown, where he arrived within five months and a half from the time of his departure.

War being declared between France and England, his correspondence with Europe was interrupted for two years, which time he employed in augmenting his nurseries, and in naturalising several trees of Asia, the seeds of which he had procured from American captains trading to China, with a view to accustom the inhabitants to the culture of useful vegetable productions. Having got considerable quantities of ginseng (*Panax quinquefolium*), he taught the inhabitants in what manner, and at what season, to gather this valuable plant, in order to preserve the qualities for which it is so much esteemed in China: at last he communicated his various observations and experiments to a society of agriculturists at Charlestown, of which he was admitted a member.

Mean time his finances diminished, and he was apprehensive of being obliged to quit America. His mind had been long occupied with a project of infinite importance to science, which was to determine the native places of the various trees of North America; in what latitude they thrive the most; where they begin to languish, till at length they disappear entirely; and also, at what altitude on the mountains they will grow, and in what soil they flourish most. He considered the native country of a tree to be that where it multiplies most and grows to the greatest size. Thus he concluded that the tulip-tree is a native of Kentucky, since it there forms vast forests, grows to 7 or 8 feet in diameter, and to 120 feet in height, in a rich clayey soil that is never inundated. Both in more elevated and lower situations, where the soil of course is of a different nature, these trees become more rare and of smaller dimensions.

It was with a design of thus tracing the botanical topography

graphy of North America that Michaux had visited the Floridas; and he now wished to proceed northwards as far as Hudson's Bay. To execute this project he made use of his last means. He applied to merchants who had the utmost confidence in his integrity, from whom he procured the money necessary for his purpose, giving them bills of exchange on persons at Paris, the managers of his patrimony. This journey was the longest and the most difficult that he had yet undertaken, but it was also of a nature to be the most useful. Having made a proper disposition for the due care of his plantations at Charlestown, he departed on the 18th of April 1792, passed through New York, and providing for the care of his gardens, proceeded by land to Quebec, where he arrived on the 10th of June.

At Quebec he collected information respecting the neighbourhood of Hudson's Bay, furnished himself with provisions and articles of barter; and ascending the river St. Laurence, proceeded to Tadoussac, a miserable village, situated at the mouth of the river Sagueney, 50 leagues from Quebec, and a station to which the Indians bring their furs. At this place he bought two bark canoes.

The Indians make these canoes with the bark of a species of birch (*Betula papyrifera* Hort. Kew.); for which purpose they choose in the spring the largest and the firmest of these trees, on the trunk of which they make two circular incisions at four or five feet distance, with a longitudinal incision on each side; and at the rise of the sap the bark is easily detached. The ribs are made with thin strips of the white cedar (*Cupressus thuyoides*); and the pieces of bark united by sewing them with an awl and the fibrous roots of the white fir (*Abies alba*), first boiled to take off the rind. The seams are then covered with the resin of the balm of Gilead fir (*Abies balsamea*). These canoes weigh about 50 pounds: they will hold four men and their baggage, and last a long time. When the Indians intend to

proceed to a great distance in the chase, they are accompanied by their wives, who carry the canoe from one torrent to another.

Michaux took four Indians to accompany him, and embarked upon the Chicoutoume, in order to ascend to Lake St. John. This river is extremely rapid ; in some places broad, and in others very narrow. Prodigious rocks impede its course ; and the country being excessively mountainous, it is often precipitated in immense falls. In such places the canoe is carried, and the travellers climb the precipices on foot, often being compelled to go many hundred toises round.

At the end of six days' navigation, Michaux entered Lake St. John, on the banks of which he collected a great number of plants. Here is the last station in those northern countries for carrying on the fur trade. He afterwards proceeded up the river named Mistassen (although it does not come from the lake of that name), where he saw a water-fall, of which all the wonderful reports he had heard had not given him any competent idea. The river, divided into various branches, is in breadth about 200 toises, and is precipitated from a mountain about 250 toises in height. This mountain is in the form of an amphitheatre, on the steps of which trees are seen through the arch of water formed by the fall over their lofty heads. The torrent rushes down the steep with an awful sound, and breaking into myriads of particles, the vapours rise like a cloud, wetting all the neighbourhood to a great distance. The torrent, repelled in its fall by the opposite banks, forms swells, which, between two rapid currents covered with foam, leave spaces in which the water is tranquil and navigable, through the windings of which the Indians dexterously guide their canoes. Michaux speaks of their dexterity as inconceivable, but in our opinion his courage is more so : we tremble in viewing him penetrate between the

two arms of the cascade, to gather a few plants upon the rocks, or silent stand in contemplation of the grandeur of the scene.

Ascending the river, he found a cabin, in which he was well received, and regaled with the boiled flesh of the beaver and preserved cranberries. It is in this desert country that the beavers live in society. Their ingeniously constructed habitations, by their solidity, render the navigation of the river difficult. The canoes must often be unladen, and carried over dykes which these animals have constructed. As man makes war upon them, they are no longer found but in the most northern and uninhabited countries.

After having traversed several mountains, the voids between which are filled with stagnant waters, Michaux, on the 3d of August, entered a small river which conducts into the Lake Mississen. The weather was now excessively cold, with a fall of snow; notwithstanding which he continued his route, and on the 4th of September arrived on the lake. After having explored the borders, he descended a river which empties itself into Hudson's Bay. He followed its course during two days, and was at no considerable distance from the bay, when the Indians, deeming it hazardous to advance more towards the north in that season, insisted positively on returning, declaring that, if the snow continued to fall, their retreat would become impracticable.

Michaux had ascertained the position of the countries, and determined which were the points the most elevated, and what was the communication between the different lakes and Hudson's Bay. He had exactly marked at what latitude the trees ceased to grow. In these vast solitudes none but a dreary vegetation was found, consisting of black and stunted pines, which bore their cones at four feet from the ground, dwarf birch and service trees, a creeping juniper,

the black currant, the *Linnæa borealis*, *Ledum*, and some species of *Vaccinium*: all the fine trees which grow in the neighbourhood of Quebec had disappeared.

The return was difficult and painful, from the swelling of the torrents. The Indians, however, descended with an inconceivable velocity, successfully conducting the canoe among the rocks; but the morasses, across which it was necessary to carry the canoe, were an obstacle to be surmounted only by courage and constancy. In these marshes, covered with *Sphagnum palustre*, among which grow *Ledum* and *Vaccinium*, our traveller sunk at every step to the knee, and was incessantly wet. As he was returning, he met two companies of Indians, whom he attended to the chase.

On the first of October Michaux arrived at Tadoussac, where he took leave of the companions of his journey, who had rendered him all the services in their power with great zeal, and the most scrupulous honesty.

I have often heard Michaux say, that when the Indians of Canada are not at war with the American colonies, the traveller is sure of meeting with a favourable reception; he nevertheless shuns them, because he is exposed to be despoiled of his provisions when he meets them. If they have killed game, and are at their repast, he may sit down with them, without saying a word, and partake of their fare; but if they are themselves pressed with hunger, they will take the traveller's provision without scruple, till they are satisfied, leaving him, however, what they do not eat. As they frequently pass many days without nourishment, their meals are longer, and more abundant than those of Europeans. The Indians of Canada, and those of the upper Mississippi, have a particular attachment to the French, whom they recognise at the first glance.

From Tadoussac, Michaux returned to Philadelphia, where
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he arrived on the 8th of December ; having been absent from Charlestown for the space of eight months, of which time he had employed three months and eighteen days in proceeding from Quebec above Lake Mistassen, in the fifty-second degree of latitude, and 160 leagues distant from every habitation.

Shortly after his return he presented to the Philosophical Society at Philadelphia, the plan of an expedition, the object of which was to explore the vast countries to the west of the Mississippi, and to determine exactly the position of the ridge of mountains which runs across New Mexico. He explained the advantages which the United States might acquire from such a journey, and his plan was exceedingly well received by Mr. Jefferson. It was on the point of being executed ; 5000 piasters (26000 livres) were already subscribed, and every arrangement was made, when Citizen Genest, minister of the French Republic, arriving at Philadelphia, claimed the services of Michaux, and charged him with a negotiation with an American general, an inhabitant of Kentucky, whither he was sent with the title of civil and political agent. As France was at that time at war with Spain, a design was formed by the French government to seize upon Louisiana, and Michaux was sent to the general, who was to command the troops, to concert with him the means of executing this plan. He was also commissioned to proceed to the borders of the Mississippi, to treat with the Indians, and engage them in the interests of France.

This political employ was by no means suitable to the peaceable disposition and pursuits of Michaux ; but he could not refuse his country the services which she demanded of him. He therefore departed on the 15th of July 1793, passed the Allegany mountains, and descended the Ohio to Louisville. Three months after, affairs relative to his mission compelled him to return to Philadelphia. To take the

shortest route, which was necessary to his object, he was compelled to pass through Virginia, from which he was separated by vast forests inhabited only by savages, who attacked travellers. He traversed these deserts in company with a caravan of twelve people. After five days' forced march, the troop separated at Holston, and Michaux, accompanied by his guides, proceeded thence to Philadelphia in four-and-twenty days, notwithstanding the rigour of the season and the badness of the roads. He arrived at Philadelphia on the 12th of December 1793, after a route of eight hundred leagues.

He found M. Genest had been replaced by Fauchet, and that the question of invading Louisiana was no longer in agitation; he determined therefore to return to Charlestown. In order to arrive there at the commencement of the spring, and not lose the seed-time, he departed from Philadelphia on the 9th of February 1794. This journey he made by land in 36 days, every where selecting all such natural productions as were remarkable.

On the 14th of July following he again took his departure to visit the interior of North Carolina, and the highest of the Allegany mountains. Returning on the 2d of October he occupied himself in gathering the autumnal plants, in cultivating his garden, and arranging the collections he proposed to send to France.

His stay at Kentucky had been too short to allow him to avail himself of its vegetable riches. He regretted that he had not been able to follow the banks of the Mississippi, and to proceed to the country of the Illipois; for a distance of 400 leagues was nothing to him. By again pledging his property in France, he procured the means of making another excursion, which occupied nearly a year, and the fruits of which were a great number of precious plants. I shall not attempt to describe the obstacles he had to surmount, or the adventures he encountered with the Indians.

Enough

Enough has already been said to display his intrepidity, and his zeal for the science; we will only observe, that being perfectly acquainted with the geography of the different countries, he went from time to time to the European establishments, situated on the banks of the rivers, leaving with them packages to be sent to his plantation; the expense of the carriage of which was repaid with an ample profit, when no accident prevented their arriving in due time.

At his return to Charlestown, on the 11th of April 1796, he found his nursery in the most flourishing condition. His plantations were extremely grand and showy, being composed not only of the finest trees of the country, but of a beautiful collection of European and Asiatic trees, which he had undertaken to naturalize in America, in many of which his success was complete, such as the tallow tree (*Croton sebiferum* L.); the scented olive (*Olea fragrans* L.); the silk-tree (*Mimosa Julibrissin*); *Sterculia platanifolia* L.; the Persian pomegranate. His plantation now became every day more dear to him; but he had exhausted his last resources, and had no other means of livelihood left but either to engage himself in the service of a foreign government, or to sell a collection which he had destined to adorn and benefit his country. Averse to both these alternatives, he resolved to return to France.

He sailed from Charlestown on the 27th Thermidor, in the 4th year (13th of August 1796). The voyage was not marked with any misfortune till the 16th Vendemiaire, when, the vessel being in sight of the coast of Holland, a dreadful storm arose. The sails were torn to pieces, the masts carried away, and the ship was wrecked on the rocks. Both the crew and passengers being worn out with fatigue, the greater part would have perished but for the exertions of the inhabitants of Egmond, a small village in the neighbourhood. Michaux was lashed to one of the yards, and was insensible when he was carried to the village.

village. He did not return to himself till many hours afterwards, when he found himself before a fire, with strange clothes on, and surrounded by about fifty persons. His first thoughts were to inquire for his collection. When he learned that his trunks, containing his other effects, had been carried away by the waves, but that the cases which held his collection, being at the bottom of the hold, had been saved, he was at once easily consoled for his misfortune. Although his health was by this time in a bad state, he was compelled to remain six weeks at Egmond, undergoing excessive fatigue night and day. His plants having been wet by the waves, he was obliged to immerse them in fresh water, and then to dry them one after another in fresh paper.

On the 5th Frimaire (25th of November) he repaired to Amsterdam, where he was expected, and an order was given to the custom-house to dispense with the ceremony of inspecting his packages. Leaving this city on the 10th, he arrived at Paris on the 3d Nivose, and on the 4th he paid a visit to the professors of the museum.

Being here received with the most flattering distinctions by men of science and learning, by the members of the government, and by the National Institute, of which he was an associated member, and having the happiness again to join his family and friends, after an absence of ten years, a cruel misfortune still embittered this enjoyment. Of more than 60,000 trees which he had sent to France, a small number only remained; the fine plantations of Rambouillet having been laid waste during the ravages of the revolution. But calm being restored, and the return of strength gradually enabling him to recommence his labours, he still consoled himself with the hope of repairing his losses. He began by placing in order the seeds collected in his latter journeys, which he divided among M. Cels, M. le Monnier, and the museum. He then requested the National Institute to make a report re-
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specting his collections, and Messrs. Laeepede, Dolomieu, Jussieu, and Cels, were charged with this office: the two first on the subjects of zoology and mineralogy, and the other two on botany and agriculture. Finally he presented to the minister a memoir on the state in which he had left his American nurseries, and solicited the means of rendering himself still more useful than he had ever been. During seven years he had received no part of his salary; the war having induced such heavy expenses, very small indemnification was granted to him, and the republic held itself freed from the engagements of the antient government. For the first time in his life Michaux now felt an inquietude respecting his private circumstances. Reproaching himself with having consumed the fortune of his son, and never having entertained the wish of enriching himself, he now limited his desires to the recovery of the patrimony he had sacrificed in his public undertakings. Failing in these hopes, having in vain solicited a commission to return to America, and regarding it as a sacred duty to commence no new enterprise at his own expense, he was consumed by the most devouring chagrin; yet from the uncommon strength of his mind he did not permit himself to be entirely cast down, but gave himself up wholly to new labours; arranging the observations he had collected, preparing his History of Oaks, and collecting the materials of a North American Flora, he lived in the mean time in Paris with the same simplicity as if he had still been among the Indians.

At this time, M. le Monnier being attacked with a malady which soon snatched him away from his friends and the sciences, Michaux quitted all his pursuits, to pass with him every moment that he thought could be useful to him; and after the death of this respectable friend and protector, he went to reside at his house, to assume the care of his gardens, and to render to his widow every possible service:
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and in these inestimable duties of gratitude and friendship he gradually lost the remembrance of his own particular misfortunes.

His History of Oaks was now printed, but the engravings were not finished, when it was proposed to Michaux to accompany Captain Baudin in an expedition to New Holland. He would have preferred returning to America; but impossible as it was to undertake the voyage at his own expense, he consented to the proposal on this condition—that if, when he arrived at the Isle of France, he should find that he could employ his time in a useful manner, he should not be compelled to proceed further. He departed with Captain Baudin on the 27th Vendemiaire, and arrived at the Isle of France on the 25th Ventose.

During the voyage his companions strongly attached themselves to him; his age and character procuring him a great ascendancy over the other naturalists: and their zeal was excited by each being eager to emulate him. The vessel having touched at Teneriffe, he proceeded to botanize on the mountains, returning late every night, and always laden with seeds and plants. In the Isle of France he was delighted with the luxuriance of the vegetation; its productions appearing to him to have a more magnificent air than either those of Persia or North America. He frequently passed many days in the woods with a single negro, having no other nourishment than a little bread, sleeping under the trees, and never returning till he had made an abundant harvest. In all these excursions he carried with him seeds of plants and trees that he thought might be naturalized in the country. M. Deschamps, lately arrived from the Isle of France, has informed me that in botanizing on the mountains he found a great number of young oaks of several inches in height, which succeeded perfectly well, and which had been sown by Michaux.

One day, during his absence, the door of his apartment

was broken open, and a hundred piastres, together with a valuable ruby, which had been brought from Persia, carried off; dreading the loss of his time in fruitless researches, he entirely abstained from all pursuit of the robbers, and was never even heard to complain.

He accepted with all the frankness of his character the offers of friendship made him by Dr. Stadman, a learned naturalist, and by M. Martin de Montcamp, whose fellow traveller he had been in the deserts of Arabia. The latter invited him to reside at his plantation, and gave him a piece of ground, and a negro to assist him. In a short time Michaux's ground was planted with the most curious productions of the island. It was necessary thus to raise them in a nursery, to send them afterwards to the museum.

Six months had now elapsed since his landing in the Isle of France, and Captain Baudin was preparing to sail for New Holland; but Michaux, who had made inquiries respecting Madagascar, felt an eager desire to visit that island. He concluded, that the number of botanists belonging to Baudin's expedition being considerable, he might make himself more useful in exploring a country not so far removed from France, whose productions are not more known to us than those of New Holland. But as he conceived that, by communicating his project, some of the persons belonging to the expedition might wish to remain with him, he kept his secret till the evening before the departure of the vessel, although in taking so little time he incurred the hazard of losing part of his effects.

He took leave of Captain Baudin, promising to furnish him at his return with a rich collection. He wrote to Paris, to the minister of the interior, to acquaint him with the motives of his stay; addressed to a member of the National Institute instructions, very minutely detailed, respecting the culture of the colony, and the means of rendering it flourishing, and at the same time wrote to his brother

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ther and son, to request the things that were necessary to the execution of his project.

M. Bory St. Vincent, with whom he had formed a strict friendship during the voyage, and who had also remained in the Isle of France, departing for the Isle of Bourbon with a design of studying its natural history, Michaux requested him to send him all the seeds and plants he could gather. M. Bory faithfully executed this commission; and on touching at the Isle of France, on his return to Europe, he found the plants which had been raised from those he had sent to Michaux, in the finest condition.

Michaux being at that time on the point of going to Madagascar, he developed to M. Bory the details of his new project. He had learnt that Madagascar is inhabited by three races of men: on the western coast the inhabitants are negroes; on the north and east they are Arabs, who arrived there about 300 years since; and, in the interior, a people considerably civilised, living under a regular government, possessing arts, and desirous of acquiring knowledge, and hospitable, although diffident of strangers. It was among the latter people that he wished to establish himself, and was persuaded he should be well received by them: he proposed to introduce among them the culture of European vegetables and fruits, and to raise in his own nurseries young plants which he meant to send to the Isle of France, where they would be preserved till occasion offered to send them to Paris.

Having established the means of correspondence with the Isle of France, he departed for Madagascar toward the end of Prairial, and landed on the eastern coast of the island, which he explored for the space of twenty leagues. Having found in the neighbourhood of Tamatada a spot favourable for establishing a garden, he began to clear it; but the inhabitants whom he employed in this labour proceeding too slowly for his ardour, he set them an example,

ample, by beginning to work at the dawn of day, and never quitting his work till after sunset.

The soil being prepared, he planted it with whatever he could gather in his excursions. His friends knowing the danger of the climate, had wished to turn him from this project: they had, above all things, recommended him to avoid too much fatigue, and not to dwell in the plains in the neighbourhood of the sea; but being persuaded that he had acquired a temperament that could resist any climate, he would never subject himself to any precautions.

His health was not affected during the first three months; but in the commencement of Frimaire, in the year 11, as he was preparing to depart for the interior of the island, according to his original plan, he caught the fever of the country, of which he expired on the second attack.

In a few days Michaux would have arrived in the mountains, where the air is salubrious; and as he was yet in the vigour of his age, he might for ten years or more have been the benefactor of the people, among whom he went to seek for vegetable productions proper to enrich his country. In every country which he had visited, he left friends from whom the news of his death will receive the tribute of tears, and his name will be the longer remembered, because every where he employed himself in rendering services the evidence of which will ever exist, and be ever renewed. In all the countries from Florida to Canada, he had introduced new vegetables, plants, and trees; and the traveller cannot penetrate into Persia, Africa, or the vast continent of North America, without finding some family that will say: "These are trees that we owe to André Michaux."

In France, the gardens of the museum, those of M. de Cels, M. le Monnier, and several other amateurs, possess a number of plants for which they are indebted to his labours; but what is of infinitely more importance is, that
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he has spread generally among our nurseries a variety of foreign trees, which were known indeed, but were found only few in number, in the gardens of the curious. They are at present multiplied to a great extent, and in the soil of France, where they may succeed in the open ground, will soon form a great and new object of wealth. Of this number is a species of walnut (*Juglans Pecan* Ait.), the wood of which is extremely fine for furniture, whilst its nut produces an excellent oil; the deciduous cypress (*Cupressus disticha* L.) which succeeds so well upon inundated grounds, where other trees do not thrive, and which is employed for various purposes; a new species of Tupelo (*Nyssa caroliniana* Lamarck), very excellent for the naves of wheels; the oak (*Quercus tinctoria* Bart.) so much in request for tanning and dyeing; the green oak of Carolina (*Quercus virens* Ait.), which grows rapidly on the sandy shores exposed to the stormy winds from the ocean, where scarcely any other tree can exist, and whose wood is excellent for the building of ships; the wax-tree of Pennsylvania, that might be used to clothe the marshy lands in the neighbourhood of Bourdeaux; ash, maples, tulip trees, &c. which in certain grounds are preferable to our native trees of the same kind, both as to their beauty and the various uses in which they may be employed: and also various plants, the objects of commerce, such as the aniseed tree and the jalap. The last of these is found in Carolina; but he also reared it in his garden, and his son afterwards brought it to the museum, where it has been ascertained to be the same as that of Vera Cruz, which will stand the winters of the southern departments of France.

A constitution naturally robust, a state of health which had never been enfeebled, and the habit of relying on himself for the supply of all his wants, gave Michaux a great confidence in his own powers. At fifty-two years of age he was even unconscious that his physical strength must
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have been diminished. Still occupied with the design of his voyage to America, he had arranged the plan in all its details, the execution of which would have required ten years more of labour and fatigue. It was not till he should have explored all the countries, situated to the west of the Apalachian mountains, from Mexico to the country of the Esquimaux, and should have established communications between the United States and the various tribes dispersed in those immense regions as well as between America and Europe, that he proposed to return to France.

It would be difficult to find a traveller who would not be terrified at the mention of such an enterprise; but Michaux was accustomed to live among the Indians. He was acquainted with their various languages, and was known in the most remote districts of North America.

His son being employed by the government to send from Charlestown the trees and plants which remained in his nurseries, and afterwards to dispose of the ground, availed himself of some months he had to spare, to visit Kentucky and Tennessee, countries of which his father had often spoken to him with enthusiasm. He penetrated 300 leagues into the countries beyond the Allegany mountains, and descended the Ohio. The habitations are widely scattered, but as soon as he named himself, the savages gave him the most friendly reception, and would go to seek people who had known his father, and who, having received from him either seed or instructions in agriculture, blessed his memory, and offered their prayers for his return.

Michaux, though of a silent turn, was of a frank temper; he made few professions of friendship; but where he could do a service to any one he regarded no trouble. In his excursions in America having met with several Frenchmen in distress, he opened his purse to them, and procured them other assistance. Many proofs of this were found in the accounts of his expenses; but the names

those he had assisted were not mentioned. His extreme simplicity, and the love and habit of independence, which had become familiar to him in his wandering and solitary life, gave a singularity to his manners and appearance; but in this a desire of making himself noticed, had no share. His manners were not those of any particular country, but equally suitable to all: appearing neither like a Frenchman, Englishman, or Canadian, wherever he went he was found more to resemble the natives than any other foreigner.

In conversation he took little share, for he neither talked of nor listened to any thing that was not useful. When he passed through a town, he visited the markets, to inform himself of the various parts whence the productions came. In the fields he interrogated the inhabitants respecting the details of their mode of culture. In fine, to an activity which never permitted him to lose a single moment, he united a perseverance which was never discouraged.

His moral qualities were so well known, that when he was sent to America, after his salary was fixed, he received unlimited letters of credit on the towns through which he had to pass, to furnish him with such sums as might be necessary for the collections he thought proper to make, and for the expenses of his travelling. His bare receipt was every where a bill of exchange, which the government engaged to honour. Michaux only made use of this power for the precise object to which it was destined, never appropriating it to pay himself any part of the arrears of his salary. Under such circumstances he could leave his son but a very small part of his paternal fortune. But this young man inherits a venerated name; knowledge acquired by his labours and travels in company with his father, and the strongest title to the countenance and protection of government.

Michaux has left few works; for, being almost incessantly employed

employed in travelling, he had little time to arrange his observations; and he thought it more useful to introduce new vegetable productions into Europe, than to describe them. We have, however, from his pen, first, a History of North American Oaks, written in French, and preceded by an introduction containing curious remarks on the oak in general. It gives the description and figure of twenty species, and several varieties, arranged in a methodical order, according to the form of the leaves, and the annual or biennial fructification. Nothing that concerns the cultivation of the oak is omitted, and the various parts of France in which each species may be advantageously naturalized, are carefully pointed out in it.

Secondly, a Memoir on the Date; with observations on the means of improving agriculture in the western colonies, by introducing various trees from the old continent. (See the *Journal de Physique, Floreal, an 9.*)

Third, a North American Flora; published since his departure, from his notes and herbal. This Flora, written in Latin, and enriched with 51 engravings, presents the characters of more than 1700 plants, among which there are about 40 new species. What renders this work extremely precious is, the exact indication of all local circumstances. Informing the reader at what latitude, to what degree of elevation, and in what soil the various plants are found, he acquaints him not only where they grow naturally, but also in what climate and soil they may be cultivated with success.

The administration of the museum justly appreciating services which André Michaux has rendered to the science of natural history, and especially to that establishment, has decreed that his bust shall be placed on the *façade* of the temperate green-house, with those of Commerson, de Combey, and other travellers, by whom its collections have been enriched.

XXII. *A few Botanical Observations*, by CHARLES
KONIG.

M. VENTENAT has communicated in the *Mémoires de la Société d' Histoire Naturelle de Paris*, p. 59. pl. 5. and afterwards in his *Plantes du Jardin de Cels*, n. 23. the description and figure of a plant under the name of *AGYNEIA impubes* L., in his account of which, in the latter work, he observes, "that the generic character of *Agyneia*, such as drawn up by Linnæus and by those authors who have copied the description of the celebrated professor of Upsal, is erroneous in almost all its parts." As the original description of *Agyneia* comes from so respectable a quarter, it is rather surprising that the finding it diametrically opposite to his own, should not have suggested to M. Ventenat a doubt as to the identity of the two plants. The truth is, that M. Cels's plant, though its seeds were sent him under this name from China, is by no means *Agyneia impubes* of Linnæus. Without the necessity of proving this by the difference that may exist in the flowers (which I have not had an opportunity of examining in a perfect state), it will be quite sufficient for our purpose to give here a short description of the specimens with fruit, preserved in the Banksian herbarium, and ascertained, by a comparison with those in the Linnean, to be the real *Agyneia*.

Upper branches slender, round, thickly beset with short and brittle hairs, of a yellowish brown colour, towards the upper end more or less flexuose, or with a knee at each leaf. The leaves are alternate, generally bifarious, ovate, sometimes approaching to oval, from one to two inches long, a half or one inch in breadth, perfectly entire, margin rather inflected, roughish to the touch, beset with rare minute hairs, smooth when viewed with the naked eye, glaucous underneath, midrib strong and prominent, with

with 4—5 ascending veins on each side, variously subdivided and anastomosing. *Petioles* very short, beset with bristles. The subglobose *capsules* towards the extremity of the branchlets, on short pedicles in the axils of the leaves, for the most part solitary, though the flowers are aggregate. As to the dissection of the fruit, I have nothing to add to the description given by Gærtner* of *BRADLEYA sinica*; for this is certainly the same with *Agyneia impubes*, and the synonym of Plukenet quoted by him, is perfectly right.

From Linnæus's description it does not appear that *Agyneia pubera* is very distinct from *A. impubes*; for, as I have before observed, there are also hairs on the leaves of the latter, very visible with the aid of a lens. But this is foreign to my purpose, which was only to show that the plant figured in the abovementioned work of M. Ventenat is not *Agyneia impubes*. Having proved this, I shall now add a few words on what it undoubtedly is.

The natural order of Euphorbiæ being very unsettled, it is in many cases extremely difficult to know to what genus a given plant of this order really belongs, from a comparison of the generic characters only; and where there is no doubt respecting the genus, it is often as difficult to determine the species, by merely consulting the specific characters, or incomplete descriptions. Thus it was not easy for M. Ventenat, who certainly had not seen any specimens of König's *PHYLLANTHUS bacciformis*, to guess that this was the plant which he described under the name of *Agyneia impubes*. But from the opportunity afforded me of examining specimens in the Banksian herbarium, and of consulting the description in Dr. König's manuscripts, I find that this plant agrees in every particular with the very exact description and figure of *Agyneia impubes* in Ventenat's work, except that the leaves are represented too thick, while they are described as *un peu épaisses* (crassiuscula), which they

* De Fruct. et Semin. Plant. vol. ii. p. 127. t. 109.

really are. Linnæus's description also, in the *Mantissa*, p. 994. and *Supplementum Plantarum*, p. 415. perfectly agrees, except with regard to the female flower, which in the former of these works is stated to be "masculis decies major s. magnitudine floris uvæ ursi, adeoque singularis." As we find nothing of this in König's description, I can only account for Linnæus's deviation by supposing that he was deceived by the shape of the unripe fruit, which being open at the top, and resembling an urceolate corolla, might be easily mistaken for a part of the flower. In the *Supplementum Plantarum* Linnæus adds to his description of this plant, "dantur et flores foeminei in eadem planta absque nectario urceolari, sed hi steriles:" these are probably the female flowers, such as they are described by König; their sterility, if real, may have been owing to accidental circumstances. (Pl. vii. f. 4.)

Professor Vahl, describing *PTEROCARPUS Rohrii* in his *Symbolæ Botanicæ*, vol. ii. p. 80. subjoins the following remark: "Asserit D. von Rohr, qui plantam in solo natali observavit, non diversam esse ab *APALOTOA spicata* Aublet *Fl. Guian. pag. 382. tab. 147.*; convenit etiam in omnibus cum figura et descriptione Aubletii, floribus et staminibus exceptis, quæ *tam false depicta quam descripta* sunt ex observatione viri laudati." Professor Willdenow (*Spec. Plant. tom. ii. p. 539.*) had made Aublet's plant a species of *Crudia*; but, probably in consequence of the above observation, he afterward (*Spec. Plant. tom. iii. p. 905.*) added the following observation to *Pterocarpus Rohrii* (*Spec. Pl. tom. iii. p. 905.*): "*CRUDIA spicata* in editione nostra *Sp. Plantarum* quam ex icone et descriptione Aubletii indicavi, est delenda; Aubletius enim flores ad aliam plantam pertinentes huic perperam addidit."

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These remarks are given with a decisiveness which, upon such authorities, would scarcely have admitted any doubt with regard to their exactness, but for the inspection of both plants in the Banksian herbarium; the one sent by Mr. von Rohr, and ascertained to be Vahl's plant, the other Aublet's original specimen of his *Apalotoa*. From these it is evident, not only that they differ in species and genus, but that they do not even belong to the same division of the natural family of *leguminosæ*. Aublet's description and delineation of the inflorescentia and the flowers are by no means false, but convey, upon the whole, an adequate idea of their parts. Nor is Mr. Rohr's observation correct with regard to the other parts, which he contends to be exactly those of his *Pterocarpus*: the folioles of the latter are, according to Professor Vahl's accurate description, and my own observation, ovate-oblong, an inch and a half long; those of *Apalotoa* are ovate-lanceolate, with an irregular base, tapering to a much longer point, and three to four inches long: the partial peduncles of *Pterocarpus Rohrii* are of the length of two lines and upwards; in *Apalotoa* scarcely of one line, and twisted.

As for the fruit added to Aublet's figure, it cannot indeed belong to *Apalotoa*, for this the linear shape of the germen renders almost impossible; nor was it drawn at the same time with the figure of the plant, as is proved by the original delineation, now in the Banksian library, which has the figure of that round pod pasted to it. As this fruit bears great resemblance to that of *Pterocarpus Rohrii*, or may possibly be the same, it is probable that this circumstance has given rise to Mr. Rohr's error; though he might have easily corrected it by more accurately comparing his plant with the drawing in the *Plantes de Guiane*. (See the explanation of pl. vii. fig. 5.

The following character and descriptions are derived from perfect specimens of *Canarium commune* L. and of its congener, *Pimela nigra* of Loureiro.

CANARIUM.

Ord. nat. Terebintacearum Juss. Diœcia-Pentandria (rectius Monadelphïa-Hexandria) Linn.

Calyx inferus, urceolatus tridentatus. *Petala* tria, concava, erecta, conniventia. *Stamina* sex, corolla breviora, infra medium connata in tubum germen cingentem. *Germen* ovato-globosum; *stylus* brevis, crassus; *stigma* subglobosum, sulcatum. *Drupa* baccata: putamen triloculare, loculamentis duobus sæpius abortu oblitteratis—*Arbores* *excelsæ*, *resinosæ* aut *balsamiferæ*, *prope basin excrescentiis quasi alati*; *folia impari-pinnata, stipulata, flores hermaphroditi abortu dioici.*

1. *CANARIUM commune*.—C. panicula terminali divaricata, tab. vii, fig. 2.

Canar. commune Linn. *Syst. Veg.* p. 741. *Mant.* 127.—

Canar. Mehenbethene Gærtn. *Sem. ii.* p. 98. t. 102.—

C. Zephyrinum s. *sylvestre primum* Rumpf. *Herb. Amb.* ii, p. 151. t. 48.

This tree, as we are informed by Rumpf, like most of its family, yields a strong-scented resin, applicable to several purposes; it attains a very considerable height, and its trunk is furnished at its base with those wing-like excrescences which we know are likewise formed at the under part of the trunk of *Ficus religiosa*, and some other trees, but in none of them so large as in *Canarium*. The bark is whitish; branches spreading. Leaves (from a very perfect specimen in the Banksian herbarium, sent by Mr. Christopher Smith from Amboina) unequally pinnate, varying in length: common petioles round, striated, woody; leaflets in four or five pairs, opposite, ovate, tapering, entire, coriaceous,

glabrous, smooth, from five to seven inches long, two or three inches broad, ribbed, with a longitudinal nerve strongly marked, petioled; *partial petioles* nearly an inch long. *Stipules* at the base of the leaf-stalks, stem-embracing, ovate-roundish, an inch long, more than half an inch wide, wrinkled below, crenate, toothed, or sometimes fringed. *Flowers* white, disposed in nearly terminal panicles with branches subdivided divaricate, 3—4 angular, compressed, somewhat tomentose. *Calyx* urceolate, coriaceous, with three broad, rounded, upright teeth. *Petals* three, perigynous, alternate with the segments of the calyx, ovate-acuminate, erect, converging, upper half carinated, margins rather undulated. *Filaments* six, 2—3 lines in length, connate at the base in a ring surrounding the germ: anthers ovate, nearly of the same length with the filaments, erect. *Ovary* superior, roundish-oblong, the size of a small pea, prolonged into a short and thick style; stigma thick, globular, with three furrows.

2. CANARIUM *Pimela*.—*C. racemis lateralibus aggregatis*, tab. vii. fig. 1.

Pimela nigra Lour. Coch. p. 407.—*Canarium sylvestre alterum* Rumpf ii. p. 155. Gærtn. Sem. ii. p. 99. t. 102.?

This is, according to the short account which Loureiro gives of it, a lofty tree, with rather spreading branches. Rumpf remarks the excrescences at the base of the trunk of this also. The original specimens in the Banksian herbarium have leaves pinnated with an odd one; *common petiole* rather more than a foot in length, smooth, round, with base swollen; *leaflets* four or five pairs, from 4—8 inches long, from 2—4 broad, ovate, entire, smooth, running out into a point, irregular at the base, longitudinal nerve prominent, generally dividing the leaf into two unequal parts; lateral nerves strong, nearly opposite, parallel, arcuated upon each other at the borders: *partial petioles* smooth, striated, nearly half an inch long. *Racemes* lateral, about a foot in length, slender,

slender, striated, rather compound, with distant branches, from 2—6 inches in length, divided at the top into bunchlets of 3—6 flowers. *Flowers* smaller than those of the other species, only 3—4 lines in length. *Calyx* inferior, small, bell-shaped, with 3 roundish teeth. *Corolla* of three ovate-acuminate, concave petals, inserted in the base of the calyx. *Stamens* the length of the corolla : filaments filiform, connate at the base into a ring surrounding the germen : anthers ovate, two-celled, versatile. *Ovary* globular, of the size of a mustard-seed : style hardly any ; stigma crenulated. *Fruit* an ovate drupe, two inches long, and nearly an inch in diameter, of a deep blue colour covered with bloom : flesh two lines thick, yellowish red : nut oval, very hard, smooth, obsoletely hexangular, tapering at both ends, but more pointed at the apex, where it is notched ; with three prominent longitudinal ribs at equal distances, running from the base towards the top, but losing themselves above the middle ; at the base where they are united there are three small holes communicating with a slender canal that traverses the axis of the nut. Loculaments three, of which two are generally very small and empty, or entirely obliterated ; the fertile one of irregular form, lined with a smooth membrane, and containing a seed exactly similar to that of Gærtner's *Canarium sylvestre*.

Obs. It remains to be ascertained how far the *Canariums*, which Rumpf describes, are distinct from each other ; to me it appears that all those enumerated in the first chapter of the third book of his *Herbarium Amboinense* are varieties of his *Canarium Zephyrinum* (ibid. cap. 2.), which is the original species above described as *C. commune* : it has hermaphrodite flowers and three-celled fruit in its wild state, while culture renders it dioecious, and its fruit one-celled by abortion. *Canarium Decumanum* appears to be a distinct species : but of the others nothing can be said with certainty. The same is the case with
Loureiro's

Loureiro's *Pimela alba* and *oleosa*, which latter is perhaps a variety of *Canarium Pimela*. As for Gærtner's *Canarium sylvestre*, I have quoted it with a mark of doubt as a synonym of *C. Pimela*, as neither his description nor figure of it expresses the ribs that run along the sides of the nut.

USTERIA is a remarkable monandrous genus first established by Professor Willdenow in the tenth volume of the Transactions of the Berlin Society of Naturalists, and afterwards taken up in his edition of the Species Plantarum. The whole of the description of *USTERIA guineensis* (the only known species) in the former work, as may be expected, is very exact; but with regard to the fruit, this accurate botanist has fallen into a very important error, which can only be ascribed to the imperfect state of the specimens which he had an opportunity of examining. Professor Willdenow describes a "Capsula disperma," and "*Semina* lineari-oblonga, hinc convexa, inde concava; *arillo* tenui, membranaceo, diaphano involuta;" but what is here considered as the seed, is in reality the *receptaculum seminum*, while what he supposes to be the aril is an aggregate of the seeds.

As the anomaly of this plant extends to its fruit, I shall here give a detailed description of this part. It is a brown, coriaceous, smooth, rather compressed, ovate-oblong capsule, tapering towards the top and pointed, more than an inch long and less than half an inch broad near its base, where it is furnished with a four-toothed calyx, three laciniæ of which are very minute, the fourth growing out to the length of nearly half an inch: at each of the flattened sides appears a depressed line, running from the top to the bottom, along which it separates into two equal halves, each closed by a membranaceous white dissepiment, having a longitudinal

a longitudinal slit, through which part of the plane surface of the receptacle of the seeds is observable.

This *receptacle* is fixed at the base of the loculament, which it nearly equals in length, and is 2 lines wide. It is an ovate-oblong, semicylindrical, fleshy body, the plane surface of which is marked with a longitudinal furrow, and turned towards the slit of the dissepiment; the convex part is towards the back of the loculament, and marked with points for the fastening of the imbricated seeds.

The *seeds*, about 10—15 in each loculament, covering in the manner of tiles the round back of the receptacle, are ovate, quite flat, bordered by a very thin, whitish, glittering, transparent, lacerated margin. This margin is the continuation of the thin coriaceous *integument* of the seed, inclosing a roundish-ovate, thin, yellowish *perisperma*, in which is lodged the *embryo*, consisting of two round, foliaceous, snow white *cotyledons*, nearly of the size of the *perisperma*, and of a short, minute, roundish *radicle* tending downwards. (See fig. 3. pl. vii.)

From this description of the fruit, together with the habit of the plant, its stipulation, &c. it must be clear to every one acquainted with Jussieu's arrangement, that *Usteria* belongs to the natural order of the Rubiaceæ, in the immediate neighbourhood of *Cinchona*; but he will be startled to find the calyx at the base of the fruit, while in all the other plants of this order it is *superus*. This is indeed a highly remarkable circumstance; for though there are natural families in which the relative situation of the ovarium and calyx appears to be less constant, yet there is no other known instance of any plant that belongs to the Rubiaceæ being furnished with a calyx so evidently *inferus* as in *Usteria*; though, in the circumstance of one of its laciniae so much exceeding the rest in length, it resembles other plants of that order, such as *Mussaenda* and *Pinckneya* of Michaux.

That

That in most cases it is very necessary to obtain a more than superficial knowledge of the various parts of a vegetable, before we undertake to pronounce confidently of its nature or the place it should occupy in our systems, is a truth more generally known than followed. Thus what Mr. Hagen * describes as three species of a most remarkable cryptogamous genus from Cafraria, called by him *Rediviva*, turns out to be nothing but the peduncled capsules of three species of *Mesembryanthemum*, which have the property of expanding upon the application of moisture, and to close again when dry †.

Equally

* *Berlinische Sammlungen*, &c. vol. ix. n. 6. p. 183.

† Dr. Sims has also observed this phenomenon in *M. pinnatifidum*, and given an account of it in the *Medical and Physical Journal* for October 1799, vol. ii. page 296. This journal being probably not in the hands of many botanists, it may be useful here to transcribe that part of the above paper which contains the description of the phenomenon.

“ The flat top of the top-shaped capsule is neatly marked with five rays, diverging from a point in the centre; as it ripens it becomes somewhat dished, so that it will hold a little water, and the footstalk is bent up so as to hold the capsule in a horizontal position. While the weather continues fine, the fruit dries, but does not open; but when the rain falls a little water lodges in the dished top, soaks in: and now the five triangular valves, the points of which before met at the centre, fly open, expand horizontally, and are even bent backwards, bringing with them an internal transparent membrane, jagged at the edges, the whole having the appearance of a full blown flower, of which the outer valves form the calyx, the inner membrane the corolla. The cells containing the seeds are thus partly laid open, exposing them to be washed out by the rain and dispersed; but the cells are not entirely uncovered, part of the inner membrane remaining attached to the dissepimenta, forming a five radiated star, by which the sudden washing away of the whole of the seeds is impeded. When the rain ceases, and the capsule becomes dry, the valves close as before, and may be made to open at pleasure, by dropping a little water into the dished top; as the water dries away, the valves again close, and thus this semblance of a flower may be made to expand or shut up at pleasure. If put into warm water, the expansion will be performed quicker. I made a little attempt to improve the spectacle by colouring the transparent membrane, to make it more resemble a corolla,

but

: Equally precipitate in this regard was Professor Burmann, who received a small specimen of a plant without flowers, but with leaves that, though not in substance and construction, still in form, were like those of an *Adiantum*; he therefore considered it as a species of this genus, calling it *Adiantum truncatum*. It was Mr. Dryander who identified Burmann's plant (among several others brought by Mr. Menzies from the north-west coast of America and now in the Banksian herbarium), and ascertained it to be a real *Mimosa*. I give here the description and figure of it from specimens in the above herbarium. It belongs to the first division *foliis simplicibus*, which contains only a few species. I name it

MIMOSA decipiens.—*M. foliis triangulari-cuneiformibus, sparsis.*

ADIANTUM truncatum fronde simplici, pinnis alternis triangulari-sublunulatis, angulosis spinulosis. *Burm. Fl. Ind. p. 234. t. 66. f. 4.*

ADIANTUM truncatum frondib. decompositis, foliolis pin-natis : pinnis alternis cuneatis subfalcatis truncatis integerrimis. *Linn. Syst. Veget. xiii. p. 790. Reich. Sp. Pl. vol. iv. p. 432.*

Habitat in Americæ septentrionalis oris occidentalibus. 4.

The *branches* are spreading : the upper ones of the thickness of a crow-quill, irregularly angulated, surrounded all over by small knobs, the vestiges of the branchlets or leaves. *Leaves* alternately placed round the branchlet, very short petioled, of irregular shape, but generally inversely triangular, and somewhat wedge-shaped, smooth, coriaceous, margined : the upper angle terminated by a small concave

but for want of proper materials I succeeded badly. Could the outer val be stained green, and the inner membrane crimson, yellow, or any ot showy colour, in such a manner that the necessary wetting should not make the colours run one into another, it would make an amusing recreation."

Fig 1



Canarium pimela

Fig 2



Canarium commune



Canarium guineense



C. Agavea impubes



Canarium agavea



Mimosa decipiens

Drawn by C.K. Engraved by T. Sargent

gland, the lateral or outer one by a sharp prickle being the continuation of a strong rib, proceeding from the petiole in a curved direction along the margin.—*Flowers* very small, yellow, sessile, disposed by 8—12 in solitary, axillary heads of the size of a small pea: general peduncle half an inch long, filiform.—*Calyx* very short, cup-shaped, truncated, obsolete ciliated.—*Corolla* of four oblong petals.—*Stamens* numerous, inserted in the calyx beneath the petals, rather connate at the base, nearly of double the length of the petals: *anthers* roundish. *Ovary* ovate, hairy; *style* of the length of the stamens.—*Fruit* unknown.

Explanation of Plate VII. and VIII.

Pl. VII. Fig. 1. Flower and fruit of *Canarium Pimelea*.

aa. flower in bud and half opened; *b.* the calyx; *c.* the connate stamens; *d.* the tube of the stamens opened; *e.* the anthers; *f.* the drupe; *g.* the nut; *h.* the same transversally cut; *i.* the embryo.

Fig. 2. Flower of *Canarium commune*. *a.* the whole flower; *b. c.* petals; *d.* the calyx, with the petals detached; *e.* situation of the stamina and the ovary; *f.* a stamen; *g.* ovary separate (the whole a little magnified).

Fig. 3. Fruit of *Usteria guineensis*. *a.* the capsule; *b.* the same divided; *c.* a valve separate; *d.* situation of the seeds on the back of the receptacle; *e.* anterior part of the receptacle; *f.* a single seed; *g.* perisperm with the embryo; *h.* embryo separate.

Fig. 4. A small fruit-bearing branch of *Agryneia impubes*.

Fig. 5. A flower of *Apalotca guineensis* Aub. without stamens. *aa.* the two hollow bracts at the base; *b.* the laciniae of the calyx; *c.* the margin of the tube of the calyx, with ten crenulae for the insertion of the stamens;

mens; *d.* the germen inserted into the side of the calyx.

Pl. VIII. A flower-bearing branch of *Mimosa decipiens*.

1. a flower-bud, natural size; 2. the same magnified;
3. a head deprived of its flowers except one, natural size; 4. the same magnified; 5. a leaf rather magnified.

XXIII. On Vegetable Monstrosities, with some Account of a pretended *Ranunculus Bellidiflorus*.

“Μήτις ἐπιλλίγεται ἀπὸ Ἀκαθάρτου Σταφ. λῆν, ἢ ἀπὸ Τριβίλων Σῦκα;”—Matth. vii. 16.

THE sense in which the word monstrosity is understood with regard to animals, especially those improperly called the more perfect ones, conveys, both in the language of science and of common life, the idea of some unusual, obvious, original deformity of the body, either in respect to the number, size, shape, or situation of its parts. Such monsters, as objects of the physiological part of natural history, are properly kept distinct from those morbid deformities which take place after the birth of the animal, and belong to pathology; though, in fact, both are equally the results of a deviation of the *nisus formativus*. If we are allowed to make a similar distinction in regard to plants, perhaps but very few deformities, or what are called (flippantly indeed, for Nature is always serious) *lusus naturæ* in the vegetable creation, can properly be denominated monsters: were it possible always to decide with certainty in this case, we might say that all such deviations from the usual course of nature as have their origin in the very seed or bud, and were not influenced in their progressive developement by adventitious circumstances, are truly monstrosities; and that all deformities or changes in the natural appearance of the vegetable

vegetable which owe their rise to circumstances foreign to it, variously modifying the evolution of its parts, are in reality *diseases*. But though we must confess that it may be sometimes difficult, perhaps impossible, to determine to which of these classes certain deviations belong; yet, if we are at all to retain a distinction between monstrosities and diseases, it must at least be allowed that many vegetable deformities, which have been usually classed with the former, cannot possibly belong to them. All the changes that we see plants undergo, for instance, in shape, as in the *plantæ fasciatæ*, the different excrescences, such as the verrucæ of several Euphorbiæ, the bedeguar of rose-trees, the galls; and the various metamorphoses produced by cynips and other insects, can in general be prevented by a prophylactic treatment, or removed by medical aid; and hence there can scarcely be any dispute about their nature.

But in whatever light we may consider such deformities, certain it is that nature obeys established laws even in her deviations, and that the *nisus formativus* is never led so far astray, either in animals or plants, as to produce beings furnished with parts or limbs that belong to the individuals of another order, genus, or even species: a Ranunculus with the flowers of a Corymbifera, a culm of wheat with a spike of rye,—nectarines, without previous budding, on a peach-tree promiscuously with its own fruit,—as much deserve the title of non-entities as all the ridiculous combinations of animals with which Licetus and others have entertained the credulity of the curious.

Accounts of such cases among vegetables are not numerous; yet there are some that have much engrossed the attention and exercised the speculation of naturalists; of these the most famous is the *Ranunculus bellidiflorus*, on which the learned John Gesner has written a dissertation, now become very scarce. The plant in question was found, in May 1752, by a boy, in a meadow near Zurich; it was

a specimen of nine inches in length, consisting of the uppermost part of the stalk, which was round and hairy, and divided into two ascending branches of equal length. Where they issued from the stalk were some single, sessile, 5-partite leaves with hairy laciniae. The two branches, one of which was more slender than the other, were divided each into two peduncles, one bearing the flower of a *Ranunculus*, the other that of a Corymbiferous plant, which both the figure and description given by Gesner prove to be *Bellis perennis* L. The other branch was furnished in the same manner, except that the calyx, corolla, and greater part of the stamens of the Crowfoot-flower, had given way to the fruit, which was yet in a state of immaturity.

Another phænomenon of this kind is the *Planta umbellifera bellidiflora*, of which a short account and figure have been given in Römer and Usteri's Bot. Mag. of 1787; the original being found in Scheuchzer's Herbarium, but without any intelligence respecting it, except that the owner of the Herbarium had received it in the year 1720. What the umbelliferous plant is cannot well be determined; but the flower issuing from it is also evidently *Bellis perennis* L. The author promised at another opportunity to give the description and figure of a Daisy-bearing *Ranunculus* found in 1762 in the district of Turgau; but I have not heard any further communication on the subject from that quarter.

Another case recorded, which appears to have attracted the notice of naturalists, is that of *Hordeum hermaphroditicum* described by Ole Worm: it displayed a short spike of four ranks, which were found to consist alternately of grains of barley and rye*.

To

* "Spica est exigua pollicis longitudinem non superans, primo aspectu hordeum præ se ferens; quatuor constans versibus, quorum singuli quinque granis. Ita vero dispositi sunt versus, ut alternatim versus unus sit hordei alter setalis. Grana præterea ipsa in glumis ita sunt constituta, ut hordei aristis

To account for these phænomena different opinions have been given: according to some, in the case of the *Ranunculus bellidiflorus*, the roots of the daisy have undergone so complete an entangling with those of the crow-foot, that the scape of the former has become connate with the stalk of the latter, and that thus both have separately brought forth their respective flowers. This explication is, however, contrary to all experience; for though there be instances of trees specifically and generically different from each other, such as elm or oak and lime trees, birch and willow, elder and poplar, that were found united for some length of their stem or branches, yet such union has never been observed to take place in herbaceous plants; nor in the description of the parts of those pretended monstrosities is there any thing that warrants the slightest suspicion of a coalescence. But quite futile is the explanation of those who are of opinion that such plants are the offspring of a hybrid generation*. Nature, ever intent to keep the species of the organical creation distinct from each other, has rendered hybrid procreation extremely difficult; and where it does take place it is only between nearly related species, of which the product has ever been found to be intermediate in all its parts between the two parent plants.

As, therefore, both these ways of explaining phænomena apparently so extraordinary are inadmissible, there is no alternative but to consider them either as productions of art, or else as morbid alterations of certain parts that give them only a *resemblance* to what they are far from being in reality.

aristis prædita firmis, longis et acutis sint: secales vero iis destituantur. Intercurrunt etiam glumæ quædam steriles, granis destituti." *Museum Wormianum*, p. 150.

* Thus good Father Cotte gives us a detailed description of a root, as he supposed, half carrot and half beet: his opinion is, that nothing in the world was required to produce such a creature, but that the wind should carry some pollen of the former on the pistils of the flowers of the latter, or *vice versa*.

It is not very long since that the love of monstrosities, both animal and vegetable, was the ruling passion of the curious: a pig with five legs, or a gosling with three, a lemon contained in another, &c. have not only given the highest gratification to a collector, but have constituted the subject of long narrations in the volumes of learned societies. Though now a sound philosophy of natural history has taught us not to lay any stress on these irregularities, but in so far as they assist in throwing light on the regular operations of nature; and though consequently such wags and cheats as furnish *lusus naturæ* find less opportunity to employ their ingenuity upon the credulity of the dilettanti in monsters; yet we do not want modern instances to prove that even professed naturalists may still be made the dupes of such impostors. Scopoli figured and described as a new genus of the Mollusca, the throat of a hen, which a malicious colleague of his had committed to spirit of wine, and put in the way of the professor; not to mention the ill fate of honest Beringer of Wurzburg, who described, figured, and published a number of petrifications of insects, &c. which the Jesuits, his enemies, had manufactured and carefully buried for him in the neighbourhood of that city:—Plants being more conveniently constructed for such tricks, it is only surprising that they should not have been more frequently made the instruments of deception. The sole instance among vegetables that we know of a detection of a fraud of this nature (but indeed the only one in which the same means of detecting it was employed), is the Ranunculus Bellidiflorus, of which the engraving is mentioned in that excellent repertory for a student in natural history, Mr. Dryander's *Catalogus Bibliothecæ Josephi Banks, &c.* vol. iii. p. 396. The plant from which this figure is made, came originally from Switzerland*,

* It is remarkable that most of the plants of this nature should be the product of the same country; but probably the success of the one given to Gesner may account for the appearance of the rest.

and was sent in 1791 to the Right Hon. Sir Joseph Banks by a naturalist in Germany. Its external form exhibited exactly the same characters we find in the above account of Gesner's plant; its hairy stalk, and the form of the leaves, left no doubts of its being either *Ranunculus repens* or *polyanthemos*, both very common in Switzerland. Intermixed with its own flowers, and on its own peduncles, it bore several other flowers that every botanist allowed to be those of *Bellis perennis*. Though a minute investigation of the outer surface of the plant did not discover the smallest traces of an artificial union, yet such apparent reality was not sufficient to stagger a philosophical incredulity grounded on the most profound knowledge of nature and her operations. Sir Joseph, by way of *experimentum crucis*, caused the marvellous plant to be soaked in boiling water, and the flowers of the daisy almost immediately detached themselves from the stalk, and floated in the liquid. Mr. Bauer of Kew made a drawing of a part of the plant sufficient to explain the fraud, which was signed by a number of naturalists present at the detection. From this an engraving was made by the late Mr. Mackenzie; of which only a comparatively small number of impressions having been distributed among botanists, we obtained permission to give it greater publicity through the channel of this periodical publication. Plate IX. represents the upper part of the hairy stalk of this feigned monstrosity, with two flower-buds of the *Ranunculus*, and the expanded flower of *Bellis perennis* both in its fixed and detached state: all highly magnified.

Thus the ænigma of daisy-flowering crowfoot appears to be satisfactorily solved: there remain, however, a few words to be added respecting somewhat similar illusions, not indeed the work of art, but the effect of disease, in which the natural course of the formative energy being obstructed, semblances of flowers or fruits are sometimes produced, such as the *Rosæ salicinæ*, as they are called: when the

leaves in some species of *Salix* are only imperfectly unfolded, and all crowded together so as to resemble in some degree a small full-blown rose. This occurrence was not long since sufficient to give full scope to the fears of the superstitious, though deriving its origin from nothing but the puncture of some insect or other extraneous circumstances*. In this manner the squamose calyx of some species of *Dianthus* has been known to assume a form very much resembling a spike of *Secale cereale*.—But more to our pur-

* According to Dr. Sims's ideas, the phenomenon of *Rosa salicina*, and other such-like metamorphoses of plants from disease, appears to be most naturally explained by the simple circumstance, that, the central part of the bud being destroyed by the larva of the insect, all power of elongation is prevented; in consequence of which the leaves that should have been dispersed along the whole shoot are all crowded together; those most external, finding more room, increase the most in size, whilst those nearest the centre are, some almost, and others altogether, suffocated for want of space to expand in: the form too will be materially altered by the unnatural compression of the growing parts. In like manner, when the larva of the insect is lodged in the centre of the undeveloped umbel, the power of elongation being destroyed, the universal and partial umbels are all crowded together; the parts least compressed, or in which the vegetating powers happen to be strong enough to overcome the resistance, will extend the furthest, variously changed in their shape by compression; whilst the florets near the centre, for want of room, are forced to take on a more tubular form: some of these may be sufficiently developed to allow of the projection of the styles, whilst others may not have sufficient vegetative power to open at all.

Sometimes it happens, that when the more important part of the plant, as the germen of the seed, is destroyed by the larva, the nourishment destined by nature for this part appears to be thrown in a superabundant quantity upon the investing parts, occasioning them to be morbidly luxuriant, as frequently happens in the grasses; the grain being destroyed, the calycine glumes are expanded into leaves of various length: so in the oak, the acorn is sometimes destroyed, whilst the scales of the calyx grow so much as to take on somewhat the appearance of a cone of some pine.

To this explanation it may be objected, that the puncture of insects being so frequent, the occurrence of these metamorphoses should be less rare. Some of them, however, are of sufficiently common occurrence: that others are not so, may be owing to its being required for their creation, that the extent of the mischief should be very nicely defined, whereas the usual effect of the larva may be the entire destruction of the bud.

pose,

pose, and perhaps illustrative of the abovementioned case of the *Umbellifera Bellidiflora*, are the observations of Mr. Borkhausen of Darmstadt. This acute observer found two plants of *Selinum carvifolium* L. in both of which was a branchlet bearing a flower that most strikingly resembled a daisy: the disk consisted of apparent tubulous florets of a pale yellow colour, some more, some less opened, and out of some of them there projected a pistil-like body; the radius was composed of ligulate florets of a greenish white colour, and tipped in one of the plants with red; the calyx communis was a simple row of broad scales, hairy on the outside. On examining these vegetables with care, Mr. Borkhausen discovered in the one with the red-tipped radius, a minute hole at the side of the calyx, and, on cutting it open, the deserted habitation of the larva of a Cynips. In the other flower he could not perceive any such aperture; whence he conjectured that it was still inhabited, and accordingly on opening it he found a minute larva of the same insect. This metamorphosis he thus explains: the foot-stalk of the umbella universalis had remained short, and was rather swollen beneath the flower; in consequence of which the involucrum universale had acquired an extravagant form, making the scales of the universal calyx; the umbellulæ had all remained stalkless, their florets were stunted, had acquired a dirty yellow colour, some being not opened at all, others incompletely, so that they had the appearance of tubulous flowers not entirely developed: the involucri partialia, likewise become luxuriant, had formed the flowers of the radius, and thus completed the monster.—The same naturalist met with a similar phenomenon in an *Heracleum Sphondylium* L. with red flowers; they much resembled radiate flowers, but the disks were not yellow. The umbellulæ in this likewise had remained on the common base, and the involucri partialia formed the scales of the common calyx; the florets of the umbellulæ were for the greatest

part not developed, and became a disk of a dirty reddish-white colour; while the large outward petals of the exterior florets, which in this plant also make the radius in the universal umbel, formed in this case a beautiful red radius, which greatly resembled that of a *Bellis*, but was shorter, so that the whole was very much like a full garden daisy not quite blown.

More instances of this nature might be enumerated, but what has been said will be sufficient to set some limits to that unphilosophical credulity that would indulge in the belief of impossible monstrosities.

C. K.

P.S. To fill up a space that must otherwise be left blank, we insert the following article, not unconnected with the subject.—Dr. Bernhardt, in Römer's Archiv. vol. ii. n. 2. p. 233. describes a *Colchicum autumnale* found by him and a Mr. Löber in a wood near Erfurt. The four leaves were the same as usual; but from the centre of these came up two monopetalous flowers, with triangular tubes of a brown-green colour; laciniae almost linear, leaf-like, marked in the middle with a green furrow, withered at the points, the three exterior surrounding the other three at the base; stamens six: filaments very unequal in length, round, inserted in the faux of the corolla, green, almost all withered at the tips, one only having something like an anther: the three styles were also green, withered at the end, and connate with the tube at their base, where no vestige of an ovary was observable.—There are two specimens exactly similar to this in the Banksian herbarium, that were found in Wiltshire.

We suppose that the flower which should have expanded in the autumn, was from some extraneous cause stunted, but its vegetative power not destroyed: hence, when the scape came to be elevated with the leaves in the spring, an imperfect flower was produced in the room of the seed-vessel.

R E V I E W.

XXIV. *Methodus qua omnes detectos Lichenes secundum organa carpomorpha ad genera, species et varietates redigere, atque observationibus illustrare, tentavit* E. ACHARIUS, M. D. Phys. provinc. Ostrogothiæ Med. primar. &c. cum tabb. æn. icones novarum specierum et figuras charact. genericorum exhibentibus. Stockholmiæ, impensis F. D. D. Ulrich. 1803. pp. 394. 8vo.

DR. ACHARIUS is already so well and so favourably known to the botanical world by his *Lichenographiæ Suecicæ Pro-dromus*, published six years ago, that the work before us can stand in need of no other recommendation than his name, to cause it to be received with pleasure by every lover of natural history. He has here taken to himself a wider field; not confining himself to the Swedish Lichens alone, and merely giving a catalogue of the rest with specific characters, but comprehending all those already known, presenting a new distribution of them into different genera, describing every species, and particularising a great number of varieties, with the addition of what he has modestly called *observations*, but what really are in many instances excellent descriptions. In an undertaking like this, at once extensive and full of difficulties, it cannot be expected that any botanist, however able, should be entirely free from the imputation of error. Many of the Lichens vary so much that it is hardly possible to determine the limits between varieties and species; the same plant is often very different in different stages of its growth; and the syno-

nymy

nymy is in a number of instances so entangled as to be wholly inextricable. It is not, however, our task minutely to hunt after mistakes, did we even consider ourselves qualified for the task, which is in itself by no means easy; for the opinions of a writer like Dr. Acharius are not to be dissented from without the surest grounds: all we can attempt is to make our readers acquainted with the general outline of the work, assuring them they will not repent the loss of the time they may afterwards bestow in acquiring a more intimate acquaintance with its contents.

To give some kind of an idea how rapidly our knowledge of the Lichens has extended itself within a few years, it may be well to state, that the number of species comprehended in the edition of the *Species Plantarum*, published at Vienna 1764, amounted only to 81; whereas Professor Hoffmann's *Flora Germanica*, edited 1795, contains no less than 266, and the *Lichenographia Suecica* 345, besides those not indigenous in Sweden. The necessity of subdividing so large a number into different genera, has therefore long been evident to most of those botanists who have bestowed their attention upon the subject, and different attempts have been made; all of which have hitherto failed, or been adopted but by few. Among these the most remarkable were those by Dr. Hoffmann, in his work above mentioned, and in his *Plantæ Lichenosæ*, which will always remain a splendid monument of the author's ability, and acquaintance with the subject; though his generic characters, founded principally upon the form and nature of the frond, have been rejected as inconsistent with the true philosophy of natural history. Dr. Acharius, in his former work, preserved indeed the whole as one genus, being of opinion that, till we became better acquainted with their fructification, it was better to allow them to remain so: but at the same time he subdivided them into 28 tribes, as a specimen of his ideas upon what might hereafter be done; and in his preface he gave
many

many excellent observations as to the different appearances of their organs of fructification, upon which we wish that the plan or compass of our undertaking allowed us to dilate.

The *Methodus Lichenum*, now before us, after the dedication, which is addressed in general terms to the most celebrated botanists of our age, begins also with some general remarks, particularly noticing the simple organisation of the Lichens, and their affinity in many respects with the mineral kingdom; but proving, as well from their fructification as from analogy, that they are truly plants, and observing upon the necessity of separating them into different genera, considering such a reformation no less possible here than among the other tribes of the class Cryptogamia. The generic characters proposed rest upon the same foundation as those used among the Filices and Musci, the situation of the fruit (here termed *Apothecium*), the manner in which it is affixed to the frond (*Thallus*), its texture and figure. The plan of the work is then stated in the following words :

“ Utilitatem et commoditatem lectorum simul respiciens, unicuique generi definitas suas subjunxi species; dubias vero, minus scilicet cognitatas, vel a me non visas, (quasque etiam signo † notavi) et autoptis examini subjiciendas, seorsum ad calcem apposui, omnesque, quantum scio, ab auctoribus ad hunc usque diem descriptas, perfectionis opellæ etiam hoc respectu pro virili curam gerens, enumeravi, novasque haud paucas et recenter detectas addidi. *Genera et species* characteribus aptioribus et accuratioribus sollicite distinxi, simul indigitans loca harum in *Prodromo Lichenographiæ*, ubi *synonyma* petenda; sin vero quædam in isto libello prætermissa fuerint aut erronea, jam observata sunt et correctata. *Primi Inventoris et Descriptoris nomen* et ejus tantum fere *Synonymon* allegavi, primariamque mihi notam *Iconem* indicavi. *Habitationis loca et Observationes,*

vationes, ubi necessariae mihi visae sunt, adjeci, ne quid deficiat ad speciem illustrandam et confusionem evitandam conducens. Præcipuas, quatenus mihi innotuere, specierum *Varietales*, ut melius in posterum dignoscantur et discernantur, *proprio suo nomine* et criteriis sufficientibus etiam distinguendas putavi. Si quædam harum apud auctores commemoratae fuerint, scripta eorum indigitavi ubi differentias et figuras L. B. ipsi perquirendi et contemplandi facultas oblata est. In Tabulis æneis Libellum una sequentibus *Figuras* novorum aliquot Lichenum, necdum, quantum scio, dolineatorum dedi; atque utilitati non minus quam ornamenti studiosus tales elegi et depinxi species, quibus generum characteres simul lucide exponerentur.—Itaque horum omnium Apothecia ad lentem mediocriter augmentem delineata, juxta Iconem, ipsum Lichenem naturali magnitudine repræsentantem, separatim exhibui.”

To this succeed a list and definition of the new terms used by Dr. Acharius in the *Methodus Lichenum*, and his idea of dividing the *Algæ* and *Fungi* into six families, all which he calls *esexual*; but his ideas on this subject, at least in some points, appear to us to require revision. The account of the genera and species concludes the work; and we would have laid before our readers the former of these, had it not been full of terms till now unknown in natural history, and unintelligible without the preceding clavis.

We cannot pretend to such an acquaintance with the Lichens as might enable us to decide upon the justice of the different genera, or the propriety with which the species are arranged under each: we may, however, be allowed a few remarks as far as our knowledge extends. It seems to us that the two first genera, *Pulveraria* and *Lepraria*, might well have been united together, nor indeed do we see any sufficient reason for removing them from the situation in which they were placed by Linnæus; for, if all the powdery *Byssi* be carried by Dr. Acharius to the Lichens, and all the

the filamentous ones by Mr. Dillwyn to the Confervæ, that genus, once so numerous, will soon be stripped of every individual. Of the *Spilomata* we know none; but the *Variolaria* appear to us by their fruit well distinguished from the others, though we can hardly think that all the species enumerated, of which the greater part have previously been considered as varieties of *Lichen fagineus*, are in reality distinct. The same remark holds good as to the *Opegraphæ*, which include the different appearances of *Lichen scriptus*, plants sufficiently unlike the rest of the Lichens, and approaching to the *Sphæriæ*, but many of them running so much into one another as to be rather varieties than species. The next genus, *Lecidea*, is principally formed of the Lichens, termed by Linnæus *tuberculate*, which appears to us well distinguished from the *scutellate* ones (*Parmeliæ*), in having the margin of their tubercles (*patellulæ*) *proper*, or of the same substance and colour as the disk, not, as in those, *accessory*, or similar to the crust. This is an extensive tribe, chiefly, indeed, comprising crustaceous Lichens, but also some imbricated, and one umbilicated species (*Lichen pustulatus*), which is so closely connected by every natural tie with the *Gyrophoræ*, that we cannot but regret the necessity of the separation. The *Calicia* come next, containing not only *Lichen sphærocephalus*, respecting which it has always been a question whether its proper situation was among the Lichens or Fungi, but also many *Trichiæ*, plants that we should certainly wish to see expunged from any future Licheno-graphia, as having little in common with the rest of the family. The *Gyrophoræ* (*Umbilicariæ* of Hoffmann) constitute a very natural genus. *Batheliwm* contains but one species, brought by Dr. Afzelius from Sierra Leone; but, as far as we can judge from the figure and description, this might without great violence have been joined to the following genus, *Verrucaria*, which affords another connecting link

between the Lichens and Fungi, its species being in general almost wholly destitute of any palpable crust, and yet in their fruit extremely resembling the *Endocarpa*, which immediately follow them, and form another natural genus; but the *Thelotremata* we should really think might with much propriety have been united to the *Verrucariæ*, provided these must be allowed still to retain their situation among the family of Lichens. The *Sphærophora*, consisting of *Lichen globiferus* and its congeners, are most justly separated; as, in our opinion, are also the *Isidia*, comprising *Lichen corallinus* with its affinities, and the *Urceolaria*, which form an intermediate tribe between the *Lecideæ* and *Parmeliæ*, differing from both in having the margins of their shields ~~often~~ both *proper* and *accessory*, and in the shields themselves being immersed in the substance of the frond, not placed on its surface.

With these finishes the first section of the work; the second beginning with the sixteenth genus, *Parmelia*, by far the most numerous of the whole, and containing no less than 204 species, among which are included all those whose apothecia are properly called shields, having a margin distinct from the disk, of the same colour as the frond. So great a number can hardly be supposed to form a wholly natural tribe; and, indeed, here we find, together with very many of the crustaceous, a great proportion of the imbricated species, several foliaceous ones, all the *Collema* and *Physciæ* of the *Lichenographia Suecica*, and some few that had been classed by former authors with the *Usnæ*. We cannot but hope that Dr. Acharius will hereafter find means to separate a mass of plants, many of which are so extremely unlike each other; and we should be particularly glad to see the gelatinous Lichens and *Physciæ* placed under distinct genera, as they have little in common, as to habit and appearance, with the rest of the *Parmeliæ*, and in the latter the margin of the shield can hardly be said to be of the

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same colour and substance with the frond. We must reserve our more particular remarks upon this subject to some more favourable opportunity.

The *Stictæ*, a small genus, agree in their apothecia with the *Parmeliæ*, but differ from them, as well as from all other Lichens, in having what are called cyphellæ, or small substances resembling tubercles, immersed in the lower surface of the frond, full of a white or yellowish powder. *Peltidea* comprises *Lichen caninus* and its congeners, a very natural tribe, which most botanists will agree in separating; but we doubt whether they will not be of opinion that the following genus, *Cetraria*, might with much propriety have been incorporated in it. The *Corniculariæ*, which Dr. Acharius considers intermediate between the *Parmeliæ* and *Usnææ*, approaching the former in their frond, the latter in their fruit, we should really think might have been joined to one of those genera as they now stand. *Usnea*, stripped of *Lichen jubatus*, *sarmentosus*, and others, which are arranged under *Parmelia*, is here reduced to an inconsiderable genus, and to us wears a very mutilated appearance. The only two remaining genera are *Stereocaulon* and *Bæomyces*, under the first of which are arranged little more than *Lichen paschalis*, and what have been considered its varieties; but under the last three tribes, very different in habit and nature, *Lichen bæomyces*, *Lichen pyxidatus*, and *Lichen rangiferinus*, with their affinities. These together compose a numerous and intricate tribe; and though, in separating the individuals, Dr. Acharius has not gone by any means so far as in his *Lichenographia Suecica*, or as Professor Hoffmann, we nevertheless suspect that many of his species will prove mere varieties. He himself expresses a doubt how far the two genera are really distinct; but he will excuse our suggesting to him, whether it might not be better, instead of uniting them, to make a slight alteration in the generic

generic characters, so as to remove to Stereocaulon the Cladoniae of Hoffmann. X

We have dwelt thus long upon the genera of the Lichens, not only as they form the most conspicuous character of the work in point of novelty, but as a subject which has never before to our knowledge been treated of by any English writer. In our opinion, which however we give with becoming diffidence, Dr. Acharius has by this new distribution done no small service to this department of botany; but whether all the genera he has adopted will stand the test of future inquiry, and whether all the species will be allowed to retain the places he has assigned to them, we have already expressed our doubts. It is always to be feared that the author of any system may adhere to his own principles so closely as to lose sight of nature, and thereby cause confusion.

Our remarks on this work have already occupied so large a space, that we have but little room left for any observations on the species. We see with pleasure that the author has availed himself of the assistance of foreign botanists, to remove many errors, as to the synonymy, which existed in his *Lichenographia Suecica*. He has also corrected several mistakes regarding the species; but upon the subject of the English Lichens he still stands in need of some further information. *L. gelasinatus* With., which is only *Calicium sessile* Pers., growing upon *L. pertusus*, he has made a new *Lecidea*. His *Lecidea privigna* (*L. simplex* Dav.) is certainly only a variety of *L. scriptus*, and consequently an *Opegrapha*. *Lecidea niveo-atra* is the same as *Lecidea epipolia*, under which *L. intermedius* Schrad. ought to be quoted without any mark of doubt. *Lecidea crenulata* (*L. crenularius* With.) is the same as *Lecidea cinereo-fusca*. *Lecidea argona* appears to us, upon the authority of German specimens, to be the first state of

❖ *L. hæmatomma* E. B. or *L. Turneri*. *Lecidea microphylla* is by no means *L. microphyllus* Schrad., but *L. escharoides* Ehr., which is quoted as a synonym under *Lecidea miscella*. Respecting the long-disputed *L. calcareus*, Dr. Acharius corrects his former work, making what was there so called a *Verrucaria*, not distinct from *L. tessellatus* E. B., and considering the true Linnean plant an *Urceolaria*, of which he gives a figure. *L. compositus* With. is also here arranged among the *Urceolariæ*, though its proper place is certainly as a variety of *Parmelia glaucoma*. *L. cupularis* Hedw., of which we have seen original specimens, and which is here considered a new *Lecidea*, is certainly the same as *Parmelia marmorea*; and *L. paradoxus* Ehr. is hardly distinct from *Lecidea vesicularis*. *Stereocaulon confine* appears to us certainly a *Fucus*, and not different from *Fucus pygmæus* Fl. Scot. We can by no means agree that *L. inquinans* E. B. is the infant stage of *Calicium claviculare*; and we can assure Dr. Acharius, or we are greatly mistaken, that there are really two distinct species now confused under the name of *L. vulpinus*.

Remarks of this nature might be extended much further; but we trust some of the author's friends in this kingdom will enable him to correct these, and similar errors, in the future editions of his work. We are happy to find he no longer regards *L. querneus* as a variety of *L. hæmatomma*, and not a little pleased that he has restored to *L.* after its original name, instead of calling it *L. tephromelas*, as in his former work. With regard, however, to the changing of specific names, we cannot consider him altogether blameless; and we wish we could bring him and some other eminent botanists to our opinion, that nothing tends so much to involve the science in chaos, and nothing is so unworthy of a real naturalist. Indeed, it is the common trick of every pretender to science, who has no other means of rendering himself conspicuous. We could wish too, that, in forming

new names, the author had availed himself less of his Greek learning. The plates, which conclude this work, are eight in number, each containing several Lichens, admirably coloured, and judiciously chosen, so as to display the generic characters and most curious species.

In short, however we may differ in opinion on trifling matters, we here take leave of what we consider the most excellent work we ever read upon the Lichens, and earnestly recommend it to those among our readers whose attention has been directed to this interesting tribe, wishing Dr. Acharius health and leisure, to continue to throw light upon their physiology and history. *He l'ait si bien*

XXV. *Jardin de la Malmaison, par E. P. VENTENAT, de l'Institut National, &c. Livraison IV—VIII. à Paris (1804). Fol. maj. Price 200 livres.*

THOUGH the present state of political affairs renders it difficult to obtain French publications, we have had an opportunity of seeing four additional numbers of this splendid and interesting work, that have lately made their appearance.

4me Livraison—opens with 19. *MESPILUS japonica*. This beautiful tree, which was brought to Paris from Canton in 1784, has thrice been in flower in the Pépinière du Roule: it well deserved a figure, and the one here given is very exact.—20. *CALENDULA flaccida*: caule suffruticoso, foliis lineari-lanceolatis, integerrimis, trinerviis, ciliatis; radio concolore; seminibus obcordatis. We have not the least doubt but that this species is *Calendula Tragus* of *Hortus Kewensis*, figured in Curtis's Botanical Magazine, pl. 408. Mr. Ventenat appears to know only the figure of *C. Tragus* in Jacquin's *Hortus Schoenbrunensis*; and finding it repre-

... sented

vented there with semiflorets of a white colour within, and deep purple without, whilst those of his *C. flaccida* are all orange-coloured, he concludes them to be distinct from each other. Though this conclusion be just, the fact is, that Jacquin's plant comes in a very questionable shape as *C. Tragus*.—21. *MIMOSA pubescens*: *Mimosa subhirsuta*; petiolo eglanduloso; pinnis foliolisque 10—12-jugis; racemis axillaribus, solitariis, folio brevioribus. A new species from New Holland, belonging to the division of *Mimosæ* with doubly-pinnated leaves.—22. *ANAMENIA coriacea*. M. Ventenat found that Linnæus, under the name of *Adonis capensis*, had introduced three different species, namely that figured by Commelin, by Burmann, and by Plukenet. Being moreover distinct from *Adonis* by having a fruit approaching that of *Hydrastis*, and the habit of an umbelliferous plant, he formed it into a new genus, with the following essential character: *ANAMENIA*—*Calyx* quinque-phyllus. *Petala* quinque aut plura, ungue nudo. *Germina* receptaculo globoso imposita. *Baccæ* plurimæ, monospermæ. The three species that were comprehended under *Adonis capensis* L., are 1. *Anamenia coriacea*: foliolis subcordatis, coriaceis, glabriusculis, lateralibus basi oblique truncatis; umbella supradecomposita, patentissima. 2. *A. laserpitiiifolia* (*Knowltonia vesicatoria* Bot. Mag.), with rigid leaves, and simple pauciflorous umbels. 3. *A. hirsuta* with lanceolate deeply serrated, hirsute leaves. To these are added two other species, namely *Anamenia gracilis* (which is perhaps *Adonis æthiopica* Thunb.) and *Anamenia daucifolia* (*Adon. filia* Linn.)—23. *STYPHELIA Gnidium*: corollæ limbo reflexo, hirsuto; spicis terminalibus, solitariis; ovatis, brevissimis; foliis sparsis, lineari-lanceolatis. A supposed new species from Botany Bay. It does not appear to be different from *Styph. parviflora* of the Botanical Repository. Ventenatia of Cavanilles is certainly the same genus with *Styphelia*; but *V. procumbens* of the *Plantæ Hispanicæ*

is not the same with *Styphelia juniperina*, as seems probable to Mr. V., unless he means by this another plant than *Epacris juniperina* (*Styphelia lanceolata* Smith.)—24. *MAGNOLIA discolor*. A beautiful plant, well known in our gardens by the name of *M. obovata*, or *M. purpurea*.

5me Livraison. 25. *CLERODENDRUM viscosum* Vt. This is a very handsome plant, and we are indebted to M. Ventenat for having thrown great light upon its history. Linnaeus, in describing his *Clerodendrum infortunatum*, in *Flora Zeylanica*, gives as synonyms both the *Peragu* of Rheede, and the *Clerodendrum folio lato et acuminato* of Burmann; two plants which are far from being the same, and are therefore properly separated by M. Ventenat. The plant here described and figured under the name of *C. viscosum*, is the *Peragu*, which is characterized by M. Ventenat thus: *C. subtomentosum; foliis cordatis, dentatis; calycibus ampliatis, subpentagonis, viscosis; laciniis corollæ secundis*. Of Burmann's plant, which he considers as the real *infortunatum* of the *Flora Zeylanica* (an opinion confirmed by our examination of the original in Hermann's *Herbarium Zeylanicum*, in the Banksian library) he gives the distinctive character as follows: *C. foliis subcordatis, integerrimis, tubo corollæ calycis triplo longiore; limbo bilabiato*.—26. *SELAGO lucida* Vt.: *spicis teretibus, terminalibus; foliis obovatis, integerrimis, lucidis; caule fruticoso*. A shrub with dark leaves and white flowers disposed in spikes, from the Cape.—27. *IONIDIUM*. Under this name the author separates from the genus *Viola* those species that have no resupinate flower, a calyx not prolonged at its base, a corolla without a spur, distinct anthers, and a capsule with few seeds. The species are subdivided into those with *petala unguiculata*, and those with *petala sessilia*: the former containing *Ionid. Calceolaria* and *Ipecacuanha*; the latter *Ionid. glutinosum, buxifolium, heterophyllum, enneaspermum, parviflorum, strictum, polygalæ-folium*.

folium. The last of these species is here figured and described: it is *Viola verticillata* of Ortega, an herbaceous plant with small flowers of a greenish purple colour. M. Ventenat does not appear to know the description and figure given of this plant, in Schrader's Journal, by Professor Sprengel, who proposed to call it *Solea verticillata*, from an English botanist, the late Mr. Sole, who wrote a monograph upon the genus *Mentha*.—28. *PONGAMIA glabra* Vt. foliis pinnatis; foliolis bi- trijugis, ovatis, acuminatis, glabris. The genus *Pongamia* of Lamarck differs from *Dalbergia* in its stamens, which are not divided into two equal parts. The species here figured and described appears to be *Robinia mitis* of Linnæus, or *Dalbergia arborea* of Willdenow.—29. *DIONÆA Muscipula*. A very good figure, and complete and correct description of this interesting vegetable. M. Ventenat notices the bristles that stand among the glandulous points in the upper surface of the leaves, but does not mention what appeared to us remarkable, that no irritation makes the two halves of the leaves clasp, unless one of the bristles be touched; a circumstance which took place in all the living specimens we have had an opportunity of examining.—30. *EUPHORBIA mellifera* H. Kew. A native of Madeira, easily known by its leaves resembling those of the common oleander, and by its deep brown flowers disposed in a thyrsus. We add that the fruit, which M. Ventenat did not see, is of the size of that of *Euphorbia Lathyris*, pedicled, tricocous, beset with warty excrescences: the cocci opening with elasticity: the interior of the seed is of course the same as in the other plants of the natural order of *Euphorbiæ*.

6me Livraison. 31. *PLATYLOBIUM formosum*. The figure here given of this well-known New Holland shrub is extremely fine, but the dissections are indifferent. We do not find such a synonym as *Cheilococca apocynifolia* in our copy of Salisbury's *Prodromus*.—32. *PERSOONIA line-*

aris. . The figure less carefully executed. M. Ventenat is mistaken in his conjecture about *Cylindria* of Loureiro, which genus does not belong to the Proteæ, but to the Jasmineæ of Jussieu, and is scarcely different from *Olea* : as for the synonym of Rumpf, given by the author of the *Flora Cochinchinensis* to this plant, we can say that it is completely wrong.—33. *ERICA lagenæformis* Salisb. Very honourable mention is here made of Mr. Salisbury's excellent monograph in the *Linnean Transactions*.—34. *RHAMNUS glandulosus* Hort. Kew. This species approaches indeed very near to *Rhamnus Alaternus*, the leaves of which are likewise often furnished with glands at their base. The fruit, which Mr. Ventenat has not seen, is an obsoletely triangular berry, with three cells, each harbouring a single, plane-convex seed, nearly as in *Alaternus*.—35. *PULTENÆA ericoides* Vt. *hirsuta* ; foliis sparsis, margine revolutis ; floribus solitariis, axillaribus. Though this plant, a native of New Holland, differs from *Pultnea* in having a calyx without appendages, it has still been thought to approach nearer to this than to any other of the related New Holland genera of Leguminosæ. We have no doubt but that it is the same with *Pultenæa villosa* of the Botanist's Repository ; though it is improbable to us that this latter plant should be the same with *P. villosa* of Dr. Willdenow, as he has not mentioned in the specific character the absence of the appendages of the calyx.—36. *VERBENA mutabilis* Jacq. The flowers rather too large : their varying colour well expressed.

7me Livraison, 37. *MAGNOLIA pumila*, first figured in the Botanist's Repository, but here represented in a very picturesque style.—38. *BORONIA pinnata* Sm. We find too frequently in this work figures taken from New Holland plants at their first year's flowering in the hot-house, and consequently in a state of comparative imperfection : this has also been the case with *Boronia pinnata*, the peduncles of
of

of which are all represented as simple, with a single flower, whereas they always are more or less corymbose and dichotomous.—39. *PARNASSIA asarifolia* Vt. This elegant new species is a native of North America: its solitary flowers are larger than those of our European species, but of the same colour. M. Ventenat distinguishes the three species known to him as follows: *PARNASSIA palustris* foliis radicalibus, cordatis; petalis subsessilibus; appendicibus multisetis.—*P. caroliniana* (Mich. Fl. Americ.) foliis radicalibus, suborbiculatis; petalis subsessilibus; appendicibus trisetis.—*P. asarifolia* foliis radicalibus, reniformibus; petalis unguiculatis; appendicibus trifidis.—A fourth undescribed species in the Banksian herbarium, a native of the north-west coast of America, and very similar in its habit to *P. asarifolia*, but different from it in the construction and the appendages of the petals, may thus be characterized: *PARNASSIA fimbriata* foliis radicalibus reniformibus; petalorum unguibus fimbriatis; appendicibus cuneatis crenatis.—40. *CLETHRA arborea*. With regard to the fruit of this species we have to observe that the placentæ, or receptacles of the seeds, are not solitary in the bottom of each loculament, as they are here described, and as is the case in *C. alnifolia*, but fixed laterally to the top of a short three-sided central column, with which the septa are in contact.—41. *NEMESIA foetida*. *Nemesia* is a new genus of M. Ventenat nearly related to *Antirrhinum*, *Linaria* of Tournefort, *Anarrhinum* and *Hemimeris*, but perfectly distinct from the three former, especially in the fruit, which is a compressed, oblong, truncated capsule; and from *Hemimeris* chiefly in its corolla being provided with a spur. The three species known to M. Ventenat are thus characterized: *N. foetens* fol. lineari-lanceolatis, inferioribus petiolatis dentatis, summis sessilibus integerrimis; floribus capitato-racemosis.—*N. linearis* fol. linearibus, integerrimis, sessilibus; floribus corymboso-racemosis (ex Herb. Jussieu).—*N. chamaedrifolia*

folia foliis ovatis, serratis, petiolatis; pedunculis axillaribus, unifloris (*Antirrhinum macrocarpon* H. Kew.). We have seen some more undescribed species in the herbaria, all from the Cape of Good Hope.—42. *LAGUNÆA squamea*: *arborescens; foliis lanceolato-oblongis, integerrimis, subtus squameis, albicantibus.* A native of Norfolk Island, and known in our gardens under the name of *Pattersonia*. (*Lagunæa Pattersonia* Bot. Mag.) The referring it to the genus *Lagunæa* requires no apology.

8me Livraison.—43. *BIGNONIA pandorea* has been figured under the name of *B. pandorana* in *Botanist's Repository*. 44. *INDIGOFERA macrostachya* Vt. *foliis pinnatis, multijugis, ovali-oblongis, obtusis, pubescentibus; racemis elongatis; caule fruticoso.* A new shrubby species from China, with large, handsome, rose-coloured flowers, disposed in large spikes.—45. *INDIGOFERA australis* Willd. Likewise a New Holland species, not unfrequent in our gardens, but not as yet figured: it is easily known from the other species with pinnated leaves, by its petiole furnished with a gland between each pair of leaflets, and by its hemisphæric, patent calyx, truncated at one side and toothed at the other.—46. *METROSIDEROS corifolia* Vt. This is not a new plant; we find it to be *Leptospermum ambiguum* of Dr. Smith (*Linn. Trans.* iii. p. 264.). It has the character of *Metrosideros* in its stamens, which are longer than the corolla; but as it agrees with *Leptospermum* in having a capitate stigma, which character Dr. Smith considered of greater importance than the length of the stamens, he referred it to the latter genus.—47. *MELALEUCA myrtifolia* Vt. *foliis constanter oppositis, ovatis, acutis, multinerviis; staminum phalangibus basi tantum coalitis.* We can assure M. Ventenat, from actual examination and comparison, that this is *Melaleuca squarrosa* of Dr. Smith, amply described in the sixth volume of the *Linnean Transactions*.—48. *RAFANIA triflora* Thunb. (*Crotalaria triflora* Linn.)

MISCELLANEOUS ARTICLES,

EXPEDITION OF CAPTAIN FLINDERS.

THE shipwreck of Captain Flinders in the Porpoise, and his subsequent detention at the Isle of France, are generally known, and cannot but have excited considerable anxiety in the minds of many of our readers for the fate of the botanists who were embarked with him on the expedition to New Holland, and their valuable collections. We are happy to have it in our power to lay before them the following account, for the materials of which we are indebted to Sir Joseph Banks.

The Investigator, owing to the unexpected failure of some of her timbers, proved so unsafe, that she was condemned at Port Jackson as unfit for service, at the latter end of the year 1803. Captain Flinders proceeded from thence, in the Porpoise, with his crew, for the purpose of soliciting in England the means of finishing the survey of New Holland. He was wrecked on reefs between New Holland and New Caledonia; but his crew were saved. He returned from the wreck in a boat that was saved, to Port Jackson, where he procured embarkations sufficient to take the crew of his own ship, and that of the Cato, which was wrecked at the same time, from a small island of sand, not more than one acre in extent, and twelve feet only above the rise of the tide, on which they had saved themselves and most of their property.

Having seen them and their property embarked on board the Rollo, bound for China, Captain Flinders sailed for England in the Cumberland, a colonial vessel of only twenty-nine tons burthen. Ignorant of the war, and distressed for provisions and water, which could not be carried

ried in so small a vessel in sufficient quantity for the whole run, he put into the Isle of France, where he is at present detained a prisoner of war. No doubt, however, can be made but that the French nation, who have on all occasions, even under the severe pressure of revolutionary misfortunes, shown the utmost partiality for, and given the most complete protection to, men of science, will liberate him as soon as his detention is known, and the more especially as he had a passport for his ship from the French government.

Mr. Brown and Mr. Ferdinand Bauer remained by his advice at Sydney, in hopes of his returning to them with another ship to complete their undertaking, which no doubt the British government would have granted him, had peace continued. They mean to wait till March next, and then to embark on board the first government vessel, to return with the treasures they have collected to England. They were not with Captain Flinders when the Porpoise was lost.

By letters received from Mr. Brown, it appears, that so long ago as the latter end of May 1802, that excellent and indefatigable artist, Mr. Ferd. Bauer, had made 350 drawings of plants, bestowing at the same time infinite pains on the dissections of the parts of fructification; and that Mr. Brown had collected and described 750 species, exclusively of the class Cryptogamia, on the southern coast of New Holland. Of these about 120 had been observed in New South Wales; a few are natives also of New Zealand, and one or two are Linnean species: the rest are all new, mostly belonging to known genera, or to new ones in the natural families most frequent in the vicinity of the colony. Mr. Bauer had also made 100 drawings of animals.

On a subsequent voyage to the northern part of New Holland, particularly to the Gulf of Carpentaria, Mr. Brown complains that their acquisitions were few in comparison of what he expected in a country so entirely new, having added only about 400 species, exclusively of grasses and cryptogamic

terrestrial plants, to those before observed on different parts of the coasts of New Holland; and of these a considerable part, he says, are common to Endeavour River also, and not a few are well known East Indian plants. There has been an intermediate account of his success, which has not come to hand*.

Though not connected with botany, we cannot withstand the temptation of inserting here an extract from one of Mr. Brown's letters: "Soon after we left the Gulf of Carpentaria, in standing into a bay formed by two islands, we were not a little surprised to observe six praos already at anchor. On the following day we went on board one of them, and procured, by the help of a Malay cook we have on board, some information relative to the object of their voyage, the substance of which is as follows. It appeared that these were part of a fleet of sixty sail belonging to the district of Bony, in the island of Celebes; that they annually visit these parts, especially the Gulf of Carpentaria, along the western side of which we had observed many traces of them. The object of their voyage is the collecting a marine animal, probably a species of Doris, which they call Terrepang: they find it in abundance; and after preparing it, which is done by first parboiling, then drying in the sun, and, lastly, smoke-drying, they carry it to Timor Laut, where they sell it to the Chinese, who are either resident there, or come on purpose for this commodity. They collect two kinds of this animal: the one black, called by the Chinese Batoo, of double the value of the other, which is white, and called by them Roro. A hundred pikol are a load for a prao: the price of the better

* Twelve butts, or large casks, of dried plants, of Mr. Brown's collecting, and four boxes of seeds, have been received by the Calcutta. The seeds are sent to Kew garden, and the dried plants, by order of the admiralty, placed under the care of Sir Joseph Banks, who has undertaken to preserve them safe until the arrival of the botanist.—We are sorry to hear of the death of Mr. Peter Good, of whose able assistance Mr. Brown speaks in the highest terms.

kind is forty dollars the pikol, of the inferior twenty. This substance is esteemed a great delicacy by the Chinese; much of the same kind, perhaps, as their esculent nests. The crew of each prao consists of between twenty and thirty people (according to their own account forty): many of them, however, are boys, who are probably useful in diving for the Terrepang. They find it most abundant in between three and ten fathoms water, and generally in a sandy bottom. An experienced diver, where they abound, can bring up ten of these animals at a time. I regret that I had only an opportunity of seeing two dried specimens of this animal; from these, however, it pretty evidently appeared to be a *Doris*."

ACCOUNT OF CHEV. PALLAS.

We are happy to find that the intelligence of the death of the celebrated Pallas, said to have been received at St. Petersburg from Akmetset, in the Crimea, and circulated in different journals and gazettes, is not only without foundation, but that this excellent naturalist enjoys a perfect state of health, and is actually engaged in publishing a new botanical work entitled *Illustrationes Plantarum imperfecte vel nondum cognitarum, cum Centuria Iconum*. It is to appear in the same shape as the *Astragali* of this author. A great part of it is dedicated to the illustration of the *saline plants*, a tribe interesting both on account of their physiology, hitherto but very imperfectly understood, their great utility in the arts and rural economy, and the changes they produce in the appearance, surface, and nature of large tracts of land. Pallas had the best opportunity, in countries so very rich in these plants, of subjecting them to a more accurate examination than had been hitherto done; of studying, on his extended travels, the changes they undergo in different climates and situations; of cultivating them in gardens particularly appropriated to their nature; and of collecting

collecting the observations of other travelling naturalists (several of them his own pupils). He is to give in this volume a general history of the saline plants, their amended generic characters, descriptions of several species of *Salsola*, 20 of *Salicornia*, 14 of *Suaeda Forsk.*, 9 of *Polypodium*, 30 of *Pedicularis*, &c., with coloured figures executed by Mr. Geissler, for the most part from living specimens on the spot. The whole work is now in the hands of Mr. Godfrey Martini, bookseller at Leipzig, who is to publish it in numbers, of which the first will make its appearance at Michaelmas next.

OTHER RUSSIAN INTELLIGENCE.

From Dr. Georgi, who has published an excellent work, *Geographico-physical History of the Russian Empire*, we learn that Mr. Stephani, known by his *Enumeratio Stirpium Agri Mosquensis*, 8vo. 1792, has prepared some *decades* of Russian plants, the plates of which are engraved by himself; and that the same gentleman has laid out a botanical garden, from which he means to communicate whatever may be new to Prof. Willdenow for publication.

When the Imperial College of Physicians of St. Petersburg sent, in 1790, an expedition to the mountains on the frontiers of Siberia, Mr. Sievers, correspondent of the Imperial academy, and an uncommonly zealous botanist, was one of them. He permigrated, not without danger of his life, the whole ridge, from the Ural mountain to Daouria, the Altay mountains, the Kirgees and Soongore Steppes, collecting a great number of plants and seeds, which he communicated to his friends, particularly to Pallas, who published a few decades of them in the *Acta Petropolitana*. Returning to St. Petersburg in 1795, he was appointed to another expedition, in which perhaps he would have proceeded as far as Thibet and Bucharia; but unhappily,

unhappily, in a fit of melancholy, he put an end to his existence by taking poison.

NEW VEGETABLE MUSCIPULA.

Dr. Barton, of Philadelphia, in the sixth volume of the Transactions of the American Philosophical Society 1804, has published an account of what is there called a new vegetable Muscipula. The doctor having collected a quantity of the flowering branches of *Asclepias syriaca*, was surprised to find in the course of a few hours a number of the common house-flies strongly attached to the flowers, some being confined by their proboscis, a greater number by their legs, and a very few by both proboscis and one or more of the legs. He at first imagined that they were merely retained by the viscous juice of the flower, but he soon found that they were held by the small valves of the flower, which have no glutinous quality; and he observes that the irritability of the valves seemed to reside exclusively in one particular spot, not larger than the point of a pin. Many of the flies were enabled, after some time, to disengage themselves from their prison without any perceptible injury; many others effected their escape, but not without the loss of a leg or a proboscis; and not a few, after making long and repeated efforts to regain their liberty, perished in their vegetable prisons. To excite the attention of such of our readers as may have this plant now flowering in their gardens, we have given this short account of Dr. Barton's curious paper, which likewise contains a remarkable observation on the effect of the nectar of the common oleander (*Nerium oleander*) in destroying flies, which it would seem to do in such numbers as to render it an object worthy of cultivation for the purpose of getting rid of these troublesome insects from our houses. The doctor, however, though aware of a similar fact having been observed in the *Apocynum androsaemifolium*, does not seem to have attended to the late Mr.

Curtis's ingenious explanation of this phenomenon; as arising, in this latter vegetable, not from any peculiar irritability of the parts, but from their mechanical structure: Vide Botanical Magazine, No. 280.

ARRIVAL OF NEW CHINESE PLANTS.

By the fleet which lately came home from China, a large number of very curious trees and plants, most of them entirely unknown to the European botanists, have been brought to this country by David Lance, Esq. who has twice been a resident in China in the service of the East India company. During the interval of these voyages, from frequent intercourse with Sir Joseph Banks, he became instructed in every thing that could enable him to apply his knowledge in natural history in the most useful manner, learning particularly what plants were most desirable to be imported into this country. Anxious that every possible advantage should be made of this opportunity, Sir Joseph proposed to the King to send out a skilful gardener at the same time; which proposal happily met with His Majesty's approbation, and Mr. Ker was accordingly appointed to this service. With such assistance Mr. Lance has not only fulfilled, but by his activity has far exceeded, Sir Joseph's expectations. There could be no doubt but that the greatest possible care would be taken, that these valuable curiosities should sustain as little injury as possible by so long a voyage; especially as to attain this most essential end, Sir Joseph Banks gave the fullest instructions, accompanied with explanatory drawings. Accordingly we find that the whole of this collection has arrived in the finest preservation at the royal gardens at Kew, where under the skilful management of Mr. Aiton, there can be little fear but that these curious plants will thrive, and may hereafter become acquisitions of the greatest value.

INTER-

INTERESTING SOUTH AMERICAN PLANT.

We are indebted for the following short but interesting notice respecting a highly useful nondescript plant, naturally growing in Santafé de Bogotá, to Mr. Vargas, a gentleman of great attainments, a native of that kingdom, but now in London. As it is communicated from memory, we could not expect any scientific description of this vegetable; but we have reason to hope that we shall hereafter have an opportunity of giving a more detailed account of it, as measures have already been taken to introduce it into this country.

The plant known in Santafé de Bogotá by the name of *Arracacha*, is one of the most useful of all the vegetables of that part of America. It belongs to the order of *Umbelliferæ*, and in its habit resembles an *Apium*; whence in some parts of the country it is called *Apio*. Its stalk generally divides from the upper part of the root into several stems, thickly beset with large orbicular leaves gashed into several sinuses, and supported by large tubular petioles, exceeding a goose-quill in thickness. The roots immediately divide into four or five branches; and each of these, if the soil be light and the weather favourable, will grow to the size, and have nearly the shape, of a large cow's horn. This root yields a food which is prepared in the kitchens in the same manner as potatoes. It is extremely grateful to the palate, more close than mealy; it is so tender that it requires little cooking, and so easy of digestion, that it is the common practice in the country to give it to convalescents and persons with weak stomachs, being thought much less flatulent than potatoes. Of its fecula is made starch, and a variety of pastry-work: reduced to a pulp, this root also enters the composition of certain fermented liquors, supposed to be very proper to restore the lost tone of the stomach. In the city of Santafé, and indeed in all places

places of this kingdom where they can obtain the Arracacha, they are of full as universal use as the potatoes are in England.

The cultivation of the Arracacha requires a deep black mould, that will easily yield to the descent of the large vertical roots. The mode of propagating it is: to cut the root into pieces, each having an eye or shoot, and to plant these in separate holes. After three or four months the roots are of sufficient size and quantity to be used for culinary purposes; but if suffered to remain six months in the ground they will often acquire an immense size, without any detriment to their taste. The colour of the root is either white, yellow, or purple; but all are of the same quality. The most esteemed in Santafé are those of Lipacon, a village about ten leagues north of the capital.

Like the potatoe, the Arracacha does not thrive in the hotter regions of the kingdom; for there the roots will not acquire any size, but throw up a greater number of stems, or at best they will be but small and of indifferent flavour. In the countries which are there called temperate, being less hot than those at the foot of the Cordilleras, this vegetable is sometimes found to thrive, but never so well as in the elevated regions of those mountains, where the medium heat is between 58° and 60° of Fahrenheit's scale. Here it is that these roots grow the most luxuriantly, and acquire the most delicious taste.

Mr. Vargas believes that this excellent plant is peculiar to the kingdom of Santafé and the province of Caracas, as he has not met with it in any other part of America where he has been, nor is it spoken of by any writer on America, except by Alcedo, who mentions it, in a few words, at the end of his *Dictionario geographico-histórico de las Indias occidentales ó América*. It is indeed surprising that such an useful vegetable should not yet have found a

writer to make us acquainted with its history, or a Sir Walter Raleigh to convey it as a valuable present to the old world: we must therefore be obliged to Mr. Vargas even for this short notice of a plant which seems not less useful than the potatoe; and which might also be cultivated in Europe, and easily conveyed thither either by seeds or shoots.

We also learn from this gentleman, that in the same country, and indeed on the same elevated parts around Santafé, a shrub is met with called *Ubillo*, in habit much like the haw-thorn, bearing innumerable small black berries, the expressed juice of which, without any preparation, yields a permanent ink. At first, before it is dry, the ink is of a pale red colour, but changes to a bright black as soon as exposed to the air. On staining one's hands, or any other part, with it, several days are required to remove the spot: the only thing you can do is to wash the part with lemon-juice, which converts the black into a rose colour. The juice of the *Ubillo* may be inspissated, and afterwards reduced to a powder: this is easily portable; and to make ink extempore, it is only necessary to dissolve a small portion of it in some water.

DEATH OF CAVANILLES.

In May last died at Madrid, Don Antonio Joseph Cavanilles, in the 59th year of his age. He was born in 1745, at Valencia, at which university he received his first education, among the Jesuits; and he afterwards entered as a student of divinity and philosophy. Here he signalized himself as a youth of uncommon abilities and diligence, not only in cultivating the sciences immediately connected with his principal study, but likewise applying himself assiduously to mathematics, history, and belles lettres. He next continued his studies at Murcia, when he was chosen by the late duke of Infantado to superintend the

the education of his sons ; and in the year 1777 he accompanied them to Paris. It may readily be imagined that, with a mind eager for information, Cavanilles found ample scope, during a residence of twelve years in that seat of learning, considerably to add to the stock of his knowledge. It was here that, under Jussieu and other celebrated botanists, he applied himself with considerable success to that science, which chiefly procured him the reputation he enjoyed as an author. His first publication, however, was not botanical : it was a pamphlet entitled *Observations sur l'Article " Espagne " de la nouvelle Encyclopédie*, and dictated by a noble patriotism to vindicate his country against the illiberal insinuations of a French critic.

In the following year, 1785, Cavanilles published at Paris his first dissertation on monadelphous plants, which continued to appear there to the eighth number, in 1789. Returning in 1790 to his own country, he published at Madrid the ninth and tenth, with a general title to the whole : *Monadelphice Classis Dissertationes decem. Matriti, 1790*. Nobody can deny that a considerable share of praise is due to the diligence of the author. Of the 296 plates in this, as well as of those in his other works, the drawings are entirely by himself, and, as such, can claim a competent share of merit ; and the engravings are executed by skilful hands.

During the progress of this work Cavanilles was engaged in a literary warfare with L'Heritier, which gave rise to some letters of his in the *Journal de Physique* : both are gone to the regions of peace ; let the memory of these and some other disputes be covered by the grave. Soon after this he commenced his *Icones & Descriptiones Plantarum quæ aut sponte in Hispania crescunt aut in Hortis hospitantur*. This work was begun in 1791, and concluded with the sixth volume in 1801 ; the whole containing 600 plates. The number of new and rare indigenous plants that are found in it was much enlarged by

his excursions through the country, undertaken by order of his government. One very valuable result of this tour is his *Observaciones sobre la Historia natural, &c. del Reyno de Valencia*, published in 1795, in two vols.; a work not only rich in observations relative to the productions of the three kingdoms of nature to be met with in that province, but likewise very interesting in regard to statistics and antiquities.

His *Descripcion de las Plantas que demostró en las Lecciones publicas del Año 1801*, mentioned with others of his writings in our Retrospect in the first Number of the Annals, was published soon after his obtaining the directorship of the royal botanic garden at Madrid; a province that could scarcely have devolved on a more sedulous botanist. In a late number of the *Anales de Ciencias naturales* (which journal has lost in him one of its most zealous conductors and contributors) the public are informed of his intention to carry on his icones in a new work, *Hortus Matritensis*, which is not only to contain figures of rare living plants products of the garden, but also those undescribed plants that are preserved in the royal herbarium in the museum of Madrid. We hear that the first volume completed by Cavanilles is in the press, and sincerely wish that it may meet with as able a continuator.

DEATH OF DR. J. B. LESTIBOUDOIS.

This botanist died at Lille, in France, at the advanced age of 90. M. Bégu, an antient pupil of his, has given us a short account of him in the *Journal Encyclopédique*. Lestiboudois, ever since 1770, to the last year of his life, gave botanical lectures; and to the moment of his death he preserved the free use of his faculties, a sound judgment and a retentive memory. When he had but few hours more to live, he ordered snow-drops, violets, and crocuses, to be brought to his bed, and compared them with the figures in

Tounefort's.

Tournefort's work. His whole existence has been consecrated to the good of the public, to the alleviation of misery, and to the exercise of social virtues; and thus he looked forward to his dissolution with a tranquillity of soul, that can only result from the consciousness of a life of rectitude. He was author of a botanical table, in which he united the system of Linnæus to that of Tournefort. He is one of the first that has pointed out, in the *Journal de Physique* for 1772, the different advantages that may be derived from the culture of potatoes; he was the principal conductor of the new dispensary at Lille; and in 1781 he published an elementary work on botany, much esteemed, under the title of *Botanographie Belgique*, which he had elaborated conjointly with his son, who is at present occupied in preparing a new enlarged edition of it. When he was professor of the central school of the department of the North, being 84 years of age, independently of his course of botanical lectures, he drew up elements of zoölogy for the use of his pupils. M. Bégu adds that, giving himself up entirely to the study of natural history, Lestiboudois never acquired a fortune, and left no other inheritance to his children but integrity and virtue. His son *François* is mentioned as a naturalist who follows the track of his father with no less zeal than talent.

ACCOUNT OF DANISH BOTANISTS.

The following contribution towards the History of Botany in Denmark, is given in Mr. Steffens's Danish translation of Willdenow's Manual of Botany :

The first Danish author in botany was Henrik Smith, Burgo-master in Malmoe. The writings (1520—1527) of this well-known medical and botanical empiric contain, according to the fashions of his time, nothing but an idle compilation. He mentions a contemporary of his, one
 Clas

Clas Urne, who had already established a botanical garden at Schonen.—In the beginning of the seventeenth century (1602—1639) Dolnitzer, probably a German, published a Herbal at Copenhagen. About the same time Christian IV. appropriated in Copenhagen a piece of ground for a botanical garden, the direction of which was given to the professor of natural history; a botanist was also appointed to make excursions through the country to collect indigenous plants. One of the most celebrated professors at that time was Ole Worm, who possessed very fine collections of subjects of natural history, the greatest part of which may still be seen in the museum of the capital. Simon Pauli, who in 1639 left Rostock for Copenhagen, to take the chairs of botany, anatomy, and surgery, was one of the principal botanists of his age; he was also the first who gave botanical lectures, and made excursions with his pupils. He lived to the age of 78, and died in 1680. In 1660, when Pauli was disabled through age from the exercise of his professorial functions, and Thomas Caspar Bartholin had resigned the chair of botany, in order to devote himself to anatomy, Ole Borrich was elected lecturer on botany, and proved the propriety of the choice by his oration *de experimentis botanicis*. After him came Peter Kylling, a very well-informed man in regard to indigenous botany; but the two Buchwalds, father and son, at the beginning of the eighteenth century, were perfectly insignificant. Holm, a naturalist much esteemed by Linnæus, whose pupil he was, was unhappily snatched away in 1739, just when preparing to take the chair of rural economy: he was certainly superior to Oeder in botanical knowledge; though it must be owned that the latter, as a man of genius and industry, did much for the promotion of the science, especially by conducting the *Flora Danica*. The publication of this excellent work afterwards devolved on Otto Frederic Müller, a native of Germany, and after his death

death on Professor Vahl, who ranks among the first botanists of the age.

We add to the above, that, since a change has taken place in the directorship of the botanic garden at Copenhagen, Professor Vahl has been appointed director of that institution, Professor Viborg second director, and Dr. Hornemann botanical lecturer. The whole is under the control of the minister.

We also understand that Professor Vahl is preparing for the press the first volume of *Species Plantarum*, a work for which he has long been collecting materials; as well as a publication on new plants of the class *Syngenesia*. Of Rafn's well-known Flora of Denmark, the third volume will soon make its appearance. This botanist is likewise engaged in elaborating a *Pomona Danica*.

PLANTS OF THE ISLE OF FRANCE, &c.

M. Aubert-du-petit-Thouars, who devoted seven years to examine the vegetation of the islands of southern Africa, has, we understand, begun a work under the title of *Histoire des Végétaux recueillis sur les Isles de France, la Réunion et Madagascar, contenant les Descriptions et Figures des Plantes qui forment des Genres nouveaux, ou qui perfectionnent les Anciens, &c.* It is to be published in numbers, each containing ten plates: the drawings are executed by the author himself, but represent only the outline of the plant. He has presented to the library of the *Muséum d'Histoire Naturelle* of Paris, a superior copy of the first number of this work, in which the plates and descriptions are accompanied with specimens of the plants from which they were taken; and has promised to do the same with the succeeding numbers. This copy will of course be of great use to those who wish to identify specimens of plants from those parts, and will at the same time bear witness to the degree of accuracy of the drawings.

CLAUDE AUBRIET.

This excellent botanist is one of those whose merits have not acquired sufficient publicity. He was born at Châlons in Champagne, and travelled with Tournefort to delineate the rarer plants of the Levant, and to study the natural history of these countries in general. For this office he was uncommonly well qualified, not only possessing much botanical knowledge, but being likewise a proficient in the art of drawing, which, on his return to France, procured him the place of painter to the botanical garden at Paris. He there depicted for Lewis XIV. a great number of exotics : of the excellence of these drawings Tournefort speaks in very high terms. “ M. Aubriet,” says he, “ s’applique avec autant de soin que d’habilité à peindre en miniature les plantes que l’on élève dans le jardin du Roi ; il n’a rien encore paru de si beau en ce genre-là, &c.” (Vid. Tournefort’s *Voyage du Levant*, Lettre I., and his *Institutiones Rei Herbariæ*, t. i. p. 50 ; as also Heineken’s *Dictionnaire des Artistes*, t. i. p. 511. art. *Aubriet*.)

In the library at Göttingen are ninety large original sketches of Aubriet, which, according to the judgment of connoisseurs, are so many master-pieces : the outlines are strikingly accurate, and at the same time drawn with great freedom and boldness ; an union that can only result from the combined talents of painter and botanist. Engravings from some of his drawings have been given in the works of Duhamel and Vaillant : but those of which we are speaking were never published, though, according to report, they deserve to see the light full as well as those of Kæmpfer and Houston ; being almost perfect in their kind.

Mr. R. F*, who has inserted this notice of Aubriet in Römer’s *Archiv f. die Bot.* vol. ii. n. 3, adds, that he may perhaps hereafter publish some of the miniature drawings of Aubriet, accompanied by short descriptions.

ANNALS OF BOTANY.

XXVI. *Botanical Observations by the late Don ANTONIO JOSEPH CAVANILLES, translated from the Spanish*.*

On the Fructification of Ferns and Mosses.

ON examining the fruit of several ferns†, I observed in their capsules some perfectly circular, opaque bodies, with an aperture in the centre, and much larger than the organs supposed to be the seeds: I called them *lenticular bodies*, both to express their form, and to confess my ignorance as to the office they have to perform in the fructification of these vegetables. Examining afterwards, with some of my disciples, the fruit of mosses, I was much gratified by observing a similar lenticular body, which appeared thirty times larger than the organs denominated the seeds of mosses. In some of them I could likewise very clearly see the central aperture; others, however, were covered by a membrane, from which issued apparently hairs or small peduncles, supporting groups of the supposed seeds. Repeated observations afterwards taught me that there are

* *Anales de Ciencias naturales*, tomo iv. p. 245.

† I made use of the microscope of M. Delabre, especially of its lens n. 2.

several of these bodies lodged in one capsule; that they varied in diameter, but that they all agreed in circular form and opacity. I further noticed that, in the mature capsules, in which the lenticular body was found completely perforated, all the small bodies usually called seeds appeared ovate, opaque at the borders, and transparent in the centre, as if empty, and consisting merely of a thin membrane.

These facts led me to suspect that those lenticular bodies might be the true seeds of the mosses and ferns; and that the organs hitherto considered as seeds might be the anthers. These anthers are like elliptical rings, supported upon short and delicate filaments, inserted into the lenticular bodies in such a manner that both organs are in contact within the capsule.—At the same time I must confess that I ~~am~~ not yet provided with data to prove what I have here advanced; but as the use I assign to these organs appears not improbable, I communicate my observations to the public with a wish that botanists may either confirm or refute my opinion, and thus throw more light upon a subject which, notwithstanding the discoveries made, is still involved in obscurity.

It is very well known that the capsules of ferns and mosses, when properly sown, will reproduce the same species, and consequently, that they are provided with real seeds: but nobody has proved that the whole of that subtile powder consists of fruitful seeds. Mr. Lindsay* had the ingenuity and patience to sow the powder of various ferns in pots with mould prepared for the purpose, and succeeded in observing their germination and development till the unfolding of their leaves; but neither this botanist, nor any other that I know of, has noticed the great difference that

* See his excellent paper in vol. ii. of the *Linnean Transactions*, p. 99.

subsists between the abovementioned lenticular bodies, and the much more subtile powder which has been considered to be the seeds. In order, therefore, to ascertain the point in question, it is only necessary to sow the lenticular bodies, and the more minute organs, separately; and if in this case the former alone should be found to germinate, no doubt could be then entertained of their being the only real seeds.

Though Hedwig and his followers maintain that there exist separate sexes in the mosses, yet other respectable naturalists are of opinion that both are concealed within the urns or capsules, where fecundation takes place in a clandestine manner. The latter opinion will be strengthened by observing the means resorted to by nature to secure the final end, viz. the process of fecundation. In the ferns the capsules remain closed, and the rings that fasten them, entire, till the seeds are arrived at maturity: they are besides generally covered with integuments adhering closely to the leaf. In the mosses we observe that variety of peristomes, teeth, and membranes, which form so many covers to prevent all extraneous communication; and, as if these parts were not sufficient, nature has added in many of them a cover to each urn, and in others a cap to defend them in their young and tender state.

If, therefore, by the aid of further experiments, it should be demonstrated that, in both these families of plants, the lenticular bodies alone are the real seeds, we might venture to pronounce the other organs, which have been hitherto considered as seeds, to be spermatic receptacles; for, as the anthers in phænogamous plants are of various shape and conformation, appearing when empty more or less transparent, and, after having discharged the pollen or spermatic fluid, become dry and hard; so these supposed seeds of the ferns and mosses are of different forms, hardened, and partly transparent. Hence it seems by no means impro-

bable that they are nothing but spermatic receptacles or anthers, and that the real seeds are the lenticular bodies*.

On the true Stigma of Iris.

The stigma is so essential to the process of fecundation, that there exists no visible fertile flower destitute of it. Its function is to imbibe from the pollen its spermatic fluid, and to convey it to the inmost recesses of the ovary for the purpose of fecundation. Hence that organ only which is capable of performing this office, deserves the name of stigma. All botanical writers have, however, considered and described as the stigmas of *Iris*, those three petal-like vaults which terminate the style; although there are other visible parts that should have the name, as they perform the function of stigmas. I allude to those three openings situate between the base of each stamen and the extremity of the style, into the interior of which they enter obliquely, in the shape of inverted cones, and unite in a central point, at about two lines distance from the place where the petal-like parts are inserted. These openings may be readily observed on making a transversal section half a line below this latter place; and their termination in one point is observable on making another transversal section nearly a line beneath the first. Some pollen may always be observed in these three ducts or openings, but never any in the petal-shaped vaults, the borders of which are distant from the anthers, and only serve to defend them from the injuries of the weather. When the anthers open, the pollen, by its own gravity, falls to the base of the filaments and towards the true stigmas,

* Though, in such ferns as we subjected to the microscope with a view of discovering the described lenticular bodies, we did not perceive any other contents within the capsules but what are supposed to be the real seeds; yet we do not mean to question the accuracy of the late author's observation, as those parts may be very visible in the species of ferns and mosses he examined, but which he unfortunately has omitted to specify. TRANSL.

where it discharges its genial fluid. If the abovementioned apertures were not found almost at the extremity of the style; if the pollen was prevented from finding its way to these by the conformation of the other organs; and if the parts generally supposed to be stigmas appeared to possess the power of absorbing the fluid of the pollen, and of transmitting it to the ovary, we might then suspect them to be justly called stigmas: but, as the contrary takes place, all suspicion of that kind must cease, and an opinion be abandoned that was probably founded on a superficial examination*.

On

* It is not now the season for re-examining those parts respecting which the author of the above paper presumes to have made a new discovery: but as it is evident that he was ignorant of Kölreuter's interesting observations on the true stigma of Iris, published as early as 1760; and as all subsequent systematical botanists, who mention rather in a vague manner those parts that constitute the chief character of the genus, appear to be in the same predicament with the late Cavanilles, it will not be deemed uninteresting to record in this place how far we are indebted to the former naturalist, and after him to Mr. Sprengel, for a further insight into the process of impregnation peculiar to Iris.

The petaloid vault that covers the stamen (and which we shall in future distinguish by the name of the *Style-Flag*, in imitation of Haller, who calls it *tubi ornamentum*,) is divided at the top into two lobes, which are always somewhat revolute: just below this division on the under side a small membrane is stretched across, always more or less triangular (*arcus eminens* of Haller). This latter, upon closer examination, Kölreuter found to be beset at its upper or inner side with minute glandules, exudating moisture; and the experiments he instituted with the flowers of several species, left no doubt in his mind that this small part alone performed the function ascribed in so vague a manner to the whole of the large petal-like expansion. He observed that, at the first opening of the flower, the upper glandulous surface of this part is in close contact with the lower surface of the style-flag, but that, after the anthers have opened, a separation takes place which exposes it completely to the view. As, however, the anther is placed within the vault of the style-flag in such a manner that the pollen (which is besides at the lower surface of the anther) cannot possibly reach the distant stigma, separated by a barrier from its influence, it is evident that such a construction must prevent any pollen from arriving at the place of its destination, if it were not for the assistance of insects, and especially of the humble bee.

On the Stamens of Periploca græca Linn.

The plants of the natural order of the *Asclepiadææ* have successively attracted the attention of a Kölreuter, Rottböll, and Jacquin, all of whom have observed the sexual organs of these vegetables, but do not agree as to the peculiar use of each part, nor in the names they have given them. Some have considered their flowers as pentandrous; others, attributing to them ten stamens, have referred them to

Kölreuter is not only the first who has pointed out the curious construction of the flower of *Iris*, and the mode of their fructification, but he also first made the most interesting observations on the mode in which those little ministers of nature discharge their office. The latter subject having, however, been afterwards treated more at large by Mr. Chr. Conr. Sprengel in his "*Entdecktes Geheimniss, &c.*" (or *Nature displayed in the Construction and Fructification of Flowers*, Berlin, 1793. 4to. with 25 crowded plates)—a work which, though its author appears occasionally to lose himself in his speculations, is original in its kind, and fraught with ingenious observations relative to the important part which insects act in vegetable impregnation,—we shall subjoin some of his observations on the fructification of *Iris Xiphium*.

Among other means which nature employs to guide insects to the receptacle of honey, if concealed in the recesses of the flower, Mr. Sprengel, in the introduction to his book, describes what he calls the honey-mark (*safst-maal*), or those spots, streaks, dots, or figures, of a colour different from that of the rest of the corolla, to which they are an ornament. This honey-mark is regularly situated at the place where the insect is to enter in order to arrive at the nectar: if the latter is remote from the entrance, the guiding mark is prolonged as far as the nectary; if there are several places of entrance, there are so many honey-marks also. Now, if the humble bee (for these are the proper fructifiers of the plants in question) descries *Iris Xiphium* from afar, she is allured by its particular beauty, and takes her course towards the flower. On approaching it, the three more prominent parts, of a blue colour, with a beautiful yellow spot in the middle, particularly attract her notice, and she lights upon the nearest. Though this part, while in close connexion with the style-flag, appears to be composed of a single piece, yet the humble bee, aware of the meaning of the yellow stain, and not regarding other appearances, works her way between the petal and the style-flag. To facilitate this labour the construction of the parts is admirably

the class Decandria. Jacquin has particularly distinguished himself by the attentive and continued examination to which he subjected these plants, and by having given exact and highly magnified figures of all the minute parts of the organs of fructification*. Finding the opinion of this naturalist conformable to nature, and confirmed by my observations on the new species described in my works†, I advanced that the species of *Asclepias*, *Cynanchum*, and *Periploca*, are decandrous; that their stigma is a spongy,

rably adapted: the style-flags, to exclude the rain, being stiff and immoveable, the petals, on the other hand, though elastic, being easily pressed downwards, the weight of the animal supplies the place of the exertion it would be obliged to use if the reverse were the case, and if the fixed petal made it necessary to lift up the style-flag.

When the humble bee has found her way into the interior, the petal, by its elasticity, presses her close to the anther, and thus makes her brush off the pollen with her hairy back. After taking as much nectar as she can conveniently obtain, she retreats backwards; in doing which, though she is indeed pressed by the petal to the real stigma, it is only to its lower or negative surface, which cannot influence the impregnation. The humble bee now takes her way to the second petal; the entrance opens, and by means of the elastic pressure, her hairy back comes into contact with the upper or positive surface of the stigma, and thus the compartment of the ovary corresponding to this stigma is impregnated with the pollen of the first visited anther. In this manner, migrating from one part of the corolla to the other, and from flower to flower, she fructifies one with pollen gathered in rambling after honey in another.

As those species of *Iris* which Mr. Sprengel had an opportunity of observing can only be fructified by humble bees, and indeed only by the larger kind of them, the lesser ones being probably too weak and light to work their way into them, it is natural to suppose that their impregnation must be precarious, especially as the humble bees are not so frequent as flies and other insects: and indeed Mr. Sprengel found that most of the plants of *Iris Xiphium*, which he observed in the garden, were imperfect in their seeds, and some did not fruit at all. In *Iris germanica*, *sibirica*, and *pseudacorus*, fructification succeeds better,—probably because in them the entrance to the stamens is not quite closed, and can be frequented likewise by smaller insects. TRANSL.

* *Miscellanea Austriaca*, vol. i. p. 1, 2. *Asclepiadearum Genitalia*.

† See *Icones et descriptiones Plantarum*, vol. i. p. 5.

almost constantly pentagonous body, placed on the extremity of the styles. Jacquin had previously proved this in his learned dissertation, defending against Rottböll the existence and function of a stigma in this pentagonal body, in the five sides of which are enchased an equal number of small more or less pointed bodies, each of which gives origin to two filaments terminated by anthers, without any manifest aperture, and destitute of globules of pollen, such as are seen in most other tribes of plants. These anthers are generally ovate, sometimes globose or club-shaped; the filaments constantly diverging, mostly pendent, each concealed in its bag open towards the upper part: I have, however, also seen them horizontal and covered with a common membrane, as in *Cynanchum grandiflorum* Icon, vol. i. p. 14.

Persuaded that the essential character of this family consists in the nature of the anthers, and the peculiar mode of fecundation, not in their form nor in the horizontal or pendent position of the filaments, I proposed to examine *Periploca græca* of Linnæus, together with the various opinions of botanical authors respecting it. All of them observed, that from the short tube of its showy corolla there rise five round, whitish bodies, which, reaching the stigma, bend archwise over it in the manner of the ribs of a cupola; they further noticed near the extremity of these bodies (called filaments) two cavities, one on each side, and filled with a clammy yellowish fluid: these cavities they considered as the anthers. If we admit this opinion, *Periploca græca* would be widely different from all the other plants of its family, in having no spermiferous anthers, and in its supposed anthers not having their filaments inserted on the stigma: but the great resemblance of the fruit of this plant to that of my *Periploca punicifolia*, and of the corolla and arched bristles called nectaries by Linnæus, made me suspect the existence of the real stamens, which I found
in

in the five pedicled bodies considered as glandules by Linnæus.

These stamens, which alternate with the cavities or anthers of Linnæus, are inserted in the stigma, from which issues the filament terminated above by a spermiferous, globose, compressed anther, and below by another steril one hanging down. In order to satisfy myself as to the nature of the substance contained within this anther, I subjected it to the microscope, when I found it to be a transparent fluid, visible only on the application of pressure.

Committing to the microscope what Linnæus and others have supposed to be the anthers of this plant, I observed, indeed, its interior lined with a yellowish pigment, but neither pollen nor sperma was visible. Having, however, found in this plant the organ essential to its family, namely the spermiferous anthers without valves, supported by filaments inserted on the stigma, it is unnecessary to have recourse to other parts that in colour and shape have some appearance of real anthers: and we know that the smallness of the anthers in these genera does by no means prevent them from exercising their functions. All that we have here to determine is, whether *Periploca græca* should remain with the other species of the genus. Jacquin is of opinion that it should be separated from *Periploca africana*, since the stamens do not grow in pairs from what he calls a *tuberculum staminiferum* (my *radix staminum*); but it is above shown that in *Periploca græca* also they issue from five distinct points round the stigma,—with this difference only, that in *Periploca africana* all the ten anthers are fertile, while in *P. græca* only five are so.

I am of opinion that these two plants must belong to different genera, and propose to refer *P. africana* to *Cynanchum*, on account of its flowers being destitute of the five involuted bristles; for these are neither mentioned in Jacquin's description, nor depicted in his figure. Such

botanists

botanists as have the opportunity of examining *Periplocæ græca* in a living state, will be best able to appreciate these observations, and to decide whether it should be separated from the genus to which it is now referred.

On Neurada procumbens of Linnæus.

Among the great number of seeds that vegetated, flowered, and fruited last year in the royal botanic garden of Madrid, there were many undescribed species of *Hermannia*, *Arctotis*, *Pelargonium*, and, besides other beautiful plants, the *Neurada procumbens* of Linnæus. It came up in May, and grew nearly a foot in height, with alternate branches and leaves; began to flower at the end of June, and by the end of September was richly laden with fruit. Its flowers, upon the whole, corresponded with the description given of them by the different authors. I saw, however, clearly, that its ten stamens are not distinct, but have their origin in the upper border of a circular and annular membrane, which, as well as the five petals, is inserted in the upper and inner part of the calyx, rather below its five laciniae. This plant, therefore, should no longer, on account of the number of its short stamens, remain in the tenth class of the Linnean system, but be transferred to *Monadelphia*, because those organs are really connate into one body.

I also examined the fruit, which in the beginning is rather pulpy, but becomes afterwards dry and hard without valves: it contains ten small nuts disposed in a circular manner round the axis. Being without valves, and containing nuts, this fruit is certainly a drupa, not a capsule, as Linnæus called it, contrary to his own principles.

On the Fecundation of a new Species of Adelia.

Among the rarer plants of the royal garden is *Adelia dodecandra* Floræ Mexicanæ, discovered by Don Martin de

de Sesé, director of the botanical expedition to New Spain, which is now completed, and promises an abundant harvest to the naturalist. This shrub was in 1802 six years old; nearly four feet high. The bark of its stem is ash-coloured, and that of the branches green. The branches come out by threes in a whorl, from the place where in the preceding year the flower-spike grew. Leaves alternate, ovate-acuminate, rather notched at the base, from two to four inches in length, and one and a half or two inches in width, bluntly toothed; teeth harsh without being coriaceous; petiole round, villous, from three to six lines in length. Stipules small and acuminate. Flowers terminal on a common peduncle; the individuals situate in the axil of a small concave bract of a greenish colour. Those of the only shrub we possess are greenish and incomplete, being female. The corolla (calyx of Linnæus) is small, monophyllous, divided into 3—5 ovate-acuminate, unequal, hard and ciliated laciniae, in the middle of which is the ovary, marked with three deep furrows, and terminated by three short and thick styles, dividing into two subulate, revolute and incurved segments.

In July every year this shrub began to be covered with flowers, continuing in succession till towards the end of August; but no male flowers being near, they regularly proved abortive. Examining it, however, this year in the beginning of August, I discovered to my utter astonishment fruit of different sizes. Persuaded that fecundation presupposes the presence of both sexes, I subjected the remaining flowers to the strictest investigation, but in none of them could the least symptom of a stamen be found. The same examination was repeated by several well informed pupils of mine, who all of them confirmed my observation, and were convinced that there were none but purely female flowers. The circumstance of its bearing this year a good deal of fruit, which was nearly ripe in the month

of August, occasioned me much embarrassment, till I observed that a *Ceanothus macrocarpus* was flowering in its immediate neighbourhood, and recollected the near affinity that subsists between these two genera, which in the natural arrangement belong to adjoining orders. This circumstance led me to consider the fecundation as hybrid. It is quite certain that our plant, though it flowered annually, never produced a single fruit till this year, when it happened to become the neighbour of this *Ceanothus*: nor is it less certain that the fruit is much the same in appearance as would have been produced under the influence of a male plant of its own species, each being composed of three capsules fixed to a common axis, which separate of themselves when arrived at maturity. Some I observed through abortion to consist of two capsules only.

In order to ascertain the influence which the male may have in this hybrid fecundation, I shall sow the seeds next spring; and if they vegetate I shall examine the form of the leaves, and afterwards that of the flowers and fruit of the new plant, to complete my observations on this phenomenon.

*Observations on the real Insertion of the Stamens in
Stapelia.*

Though Professor Jacquin has thrown considerable light upon the intricate construction of the flowers of the Asclepiadæ, yet subsequent writers have not all availed themselves of the information respecting them given by that celebrated botanist, in his *Miscellanea Austriaca*; nor could it be expected that many would have patience enough to repeat his experiments. Some have still maintained that the plants of this order have only five stamens,—others that they are perigynous,—because this is the case with the corolla, in which they supposed the stamens to be inserted. Hence too Jussieu has placed them in the fourteenth order
of

of his eighth class, one of the characters of which is *Stamina quinque imæ corollæ inserta*. I have proved in my work, *Icones, &c.* that the species of *Asclepias*, *Cynanchum*, and *Periploca*, have ten epigynous stamens, being inserted in the stigma without adhering in the least to the corolla, or to its appendages. Having last year had further opportunity of examining a great number of individuals of *Stapelia variegata* of Linnæus, I shall here add my observations to those communicated before by Prof. Jacquin.

From the centre of its large corolla, and composed of its very substance, there issues a body that sheaths part of the two ovaries, and soon divides into ten laciniaë, five of which are linear, and expanded in the form of a star : alternating with these are five others, straight and filiform, till they come to the ovary, where they divide into two branches, one of which takes its direction outwards, while the other follows that of the stigma, over which it projects ; and on that part where it begins to be in contact with the stigma, it is rather thicker, and furnished on the inside with two cavities, that include and protect two anthers, which, by means of a slender and short filament, are fixed to a brownish red point, situate in one of the angles of the pentagon. The same is observable in the other four arms or internal branches, from which result ten cavities and an equal number of stamens.

If, a short time previous to the natural opening of the flower, the laciniaë of the corolla be separated, there are seen standing over the stigma, the five interior arms or branches in which are the abovementioned cavities : on elevating one of these with a needle or nice instrument from the stigma, its two cavities will be observed to be empty, having parted with the two reddish spermiferous ovate bodies, or anthers, destitute both of pollen and valves. These anthers may be seen suspended by the filaments from the beforementioned red point situate at the angle of the pentagonous

pentagonous and spongy stigma. It should be observed that, unless the arm be separated with care, the filaments will break, and thus leave the anthers encased within the cavities.

From all this it follows that the Stapeliæ, Cynancha, Periplocæ, and Asclepiades, cannot remain in the eighth class of the natural arrangement: as the insertion of the stamens is epigynous, and the corolla, though it be hypogynous, and of one piece, does not fulfil with regard to them any other office than that of covering them by means of the appendages that tend towards the true stigma.

The two follicles, as we have observed this year, are nearly cylindrical, pointed, straight, parallel, and rather unequal in size, the larger being more than four inches in length, and three or four lines in diameter: they are of a yellowish green besprinkled with purplish dots.

XXVII. Genera et Species FILICUM Ordine systematico redactorum, adjectis Synonymis et Iconibus selectis, nec non Speciebus recenter detectis, et demum plurimis dubiosis, ulterius investigandis. Auctore Prof. O. SWARTZ*.

CONSPECTUS GENERUM.

A. FILICES ANNULATÆ.

Capsulis (Sporangiis Hedw.) unilocularibus, annulo (symplokie Hedw.) articulado elastice dissiliente cinctis.
Semina numerosissima.

Capsulæ diverse aggregatæ.

* *nudæ* :

1. **ACROSTICHUM.**—*Capsulæ* confertissimæ, discum frondis totum occupantes.

* Schrader's Botanisches Journal. Band II. p. 1-130.

2. MENISCIUM.—*Capsulæ* in lineolis subparallelis venis frondis interjectis.
3. HEMIIONITIS.—*Capsulæ* in lineis decussatis dichotomis reticulatisve.
4. GRAMMITIS.—*Capsulæ* in lineolis rectis sparsis.
5. POLYPODIUM.—*Capsulæ* in punctis subrotundis sparsis.
 ** *Indusio* (Willd. *Involucro* Smith, *Perisporangio* Hedw.) *vario modo velatæ*.
6. ASPIDIUM.—*Capsulæ* in punctis subrotundis, sparsis; *Indusio* umbilicato s. dimidiato tectis.
7. ASPLENIUM.—*Capsulæ* in lineolis rectis, sparsis; *Indusio* laterali *interius* dehiscente.
8. CÆNOPTERIS.—*Capsulæ* in lineolis submarginalibus; *Indusio* laterali *exterius* dehiscente.
9. SCOLOPENDRIUM.—*Capsulæ* in lineolis sparsis, geminis, interveniis; *Indusiis* superficialiis, sutura longitudinali dehiscantibus.
10. DIPLAZIUM.—*Capsulæ* in lineolis sparsis, decussantibus, venæ frondis approximatis, geminis; *Indusiis* e vena ortis, utrinque *exterius* dehiscantibus.
11. LONCHITIS.—*Capsulæ* in lineolis lunulatis, sinibus frondis subjectis; *Indusio* e margine frondis inflexo, intus dehiscente.
12. PTERIS.—*Capsulæ* in linea continua marginali; *Indusio* e margine frondis inflexo, *interius* dehiscente.
13. VITTARIA.—*Capsulæ* in lineis longitudinalibus continuis per discum s. marginem frondis; *Indusio* duplici continuo, altero *exterius* altero *interius* dehiscente.
14. ONOCLEA.—*Capsulæ* confertæ, dorsum totum pinnarum frondis diversæ occupantes; *Indusio* e margine membranaceo frondis revoluta, continuo s. interrupto, *interius* dehiscente.
15. BLECHNUM.—*Capsulæ* in lineis longitudinalibus, solitariis, continuis, costa frondis parallelis; *Indusio* superficiali, continuo, *interius* dehiscente.

16. WOODWARDIA.—*Capsulæ* in punctis oblongis, distinctis, ad costam approximatis; *Indusiis* superficialiis fornicatis, *interius* dehiscentibus.
17. LINDSÆA.—*Capsulæ* in linea continua submarginali; *Indusio* superficiali, *exterius* dehiscente.
18. ADIANTUM.—*Capsulæ* in puncta discreta s. lineolas ad marginem frondis distributæ; *Indusiis* membranaceis e margine ortis, replicatis, *interius* dehiscentibus.
19. DAVALLIA.—*Capsulæ* in punctis marginalibus distinctis; *Indusiis* semicucullatis, superficialiis, distinctis, truncatis, *exterius* dehiscentibus.
20. DICKSONIA.—*Capsulæ* in punctis marginalibus, subrotundis, distinctis; *Indusio* duplici, altero superficiali, *exterius* dehiscente, altero e margine frondis inflexo, *interius* dehiscente.
21. CYATHEA.—*Capsulæ* in punctis subrotundis, sparsis, receptaculo columnari adsidentes, intra *Indusium* calyciforme, superne dehiscens.
22. TRICHOMANES.—*Capsulæ* in punctis marginalibus, subexsertis, columnulæ adsidentes, intra *Indusia* urceolata, monophylla.
23. HYMENOPHYLLUM.—*Capsulæ* in punctis marginalibus, subexsertis, columnulæ adsidentes, intra *Indusia* bivalvia, plana.
24. SCHIZÆA.—*Capsulæ* in dorso appendiculi frondis confertæ; *Indusiis* e margine appendiculi inflexis, continuis.

B. EXANNULATÆ.—*Capsulis* absque annulo medio dehiscentibus.

Capsulæ confertæ s. solitariæ.

* *uniloculares, bivalves.*

25. OSMUNDA.—*Capsulæ* confertæ, subglobosæ, pedicellatæ, in racemum s. in dorso frondis dispositæ.

26. **LYGODIUM**.—*Capsulæ* solitariæ intra squamas imbricatas distichas spicarum marginalium frondis, sessiles.
27. **GLEICHENIA**.—*Capsulæ* ternæ, ovales, foveola pinnularum frondis subimmersæ, sessiles.
28. **ANGIOPTERIS**.—*Capsulæ* ovales, in lineam prope marginem frondis dispositæ, duplici serie sibi invicem approximatae, sessiles.

**** multiloculares.**

29. **DANÆA**.—*Capsulæ* oblongo-lineares, parallelæ, frondi immersæ, *loculis* duplici serie superne dehiscentibus.
30. **MARATTIA**.—*Capsulæ* ovales, sparsæ, superne bipartibiles, *loculis* duplici serie hiantibus.

C. GENERA FILICIBUS AFFINIA.

31. **PSILOTUM**.—*Capsulæ* globosæ, subtrilocæ, sparsæ, axillari-laterales, sessiles, triloculares, valvulis tribus apice dehiscentes.
32. **BOTRYCHIUM**.—*Capsulæ* subglobosæ, distinctæ, adnatae, in spicam racemosam congestæ, uniloculares, ab apice ad basin dehiscentes.
33. **OPHIOGLOSSUM**.—*Capsulæ* subglobosæ in spicam subarticulatam disticham connatae, uniloculares, transverse dehiscentes.
34. **LYCOPODIUM**.—*Capsulæ* in axillis squamarum in spicas oblongas imbricatas digestarum, s. ipsorum foliorum, sessiles, reniformes, bivalves, elastice dehiscentes.

SPECIES FILICUM.

A. Annulatæ.

1. ACROSTICHUM LINN.

CHAR. *Capsulæ* accumulatae per totam paginam inferiorem frondis—*Indusium* nullum.

* *fronde indivisa.*

1. *A. citrifolium*, frondibus lanceolato-ovatis integris venosis subsessilibus, surculo radicante.—*Hempionitis parasitica* L.—*Plum. Filic. tab.* 116.
2. *A. longifolium*, frondibus lineari-lanceolatis integris marginatis, fertilibus spiraliter convolutis. *Jacq. Coll.* 2. p. 105.—*Plum. Fil. t.* 135.
3. *A. latifolium*, frondibus marginatis integris, sterilibus lato-lanceolatis, fertilibus ovato-lanceolatis. *Flor. Ind. Occ.*
4. *A. simplex*, frondibus integris, sterilibus lanceolatis acuminatis, fertilibus lineari-lanceolatis. *Fl. Ind. Occ.*
5. *A. petiolatum*, frondibus integris, sterilibus lineari-lanceolatis, stipitibus elongatis costaque squamulosis, fertilibus linearibus. *Fl. Ind. Occ.*
6. *A. lingua*, frondibus oblongis obtusis subtus ferrugineo-tomentosis, surculo radicante. *Thunb. Fl. Jap. t.* 33.
7. *A. villosum*, frondibus lato-lanceolatis subcrenulatis utrinque villosis. *Fl. Ind. Occ.*—*Plum. Fil. t.* 127. D.
8. *A. hirtum*, frondibus oblongo-lanceolatis utrinque acuminatis supra stipitibus paleaceo-hirtis, margine crenulato punctato, fertilibus ovato-lanceolatis. *Fl. Ind. Occ.*
9. *A. muscosum*, frondibus squamosis, sterilibus ovato-lanceolatis obtusis, fertilibus lineari-lanceolatis. *Fl. Ind. Occ.*—*Plum. Fil. t.* 139.
10. *† *A. squamosum*, frondibus lineari-lanceolatis utrinque stipitibusque paleaceo-squamosis, paleis ciliatis.*
11. *A. crinitum*, frondibus lato-ovatis obtusis hirsutis supra crinitis. *Linn.*—*Plum. Fil. t.* 125.
12. *A. heterophyllum*, frondibus integris, sterilibus sub-

† Signum (*) prefixum species novas vel adhuc fere obscuras indigitat: ubi vero diagnosin sequitur, eadem species descriptione & observatione quadam posthac illustrandæ sunt.

rotundis,

rotundis, fertilibus linearibus. *Linn.*—*Rheede Mal. xii.*
t. 29.

** *fronde divisa.*

13. *A. peltatum*, frondibus distinctis, sterilibus apice dichotomo-radiatis, laciniis linearibus, fertilibus reniformibus crenulatis. *Flor. Ind. Occ.*—*Osmunda peltata Sw. Prodr.*—*Plum. Fil. t. 50. A.*

14. *A. biforme*, frondibus lineari-dichotomis pendulis, laciniis sterilibus linearibus, fertilibus reniformibus integris: primordiali magno erecto oblongo sublobato.—*Osmunda coronaria Müller Naturforsch. n. 21. p. 107. t. 3.*

15. **A. alaicorne*, frondibus palmatis erectis, laciniis dichotomis lanceolatis obtusis versus apices fructiferis: primordialibus reniformibus lobatis venosis.*—*Neuroplatyceon Pluk. Alm. t. 429. f. 2.*

*** *fronde pinnata.*

16. *A. quercifolium*, frondibus distinctis ternatis, sterilium foliolis terminalibus ovatis incisis, lateralibus trilobis, fructificantium linearibus subrepandis. *Retz. Vahl.*—*Ophioglossum Zeylanicum Houytt. N. H. ii. t. 94. f. 1.*—*Osmunda trifida Jacq. Coll. iii. t. 20. f. 3.*

17. **A. auritum*, frondibus distinctis ternatis, sterilibus foliolis pinnatifidis medio majori, lateralium laciniis baseos deorsim elongatis, fructificantium bipinnatis linearibus.*

18. *A. aureum*, pinnis linguæformibus glabris. *L.*—*Plum. Fil. t. 104.*

19. *A. punctulatum*, pinnis lanceolatis integris supra punctatis, infimis auriculatis, terminalibus basi coadunatis. *Linn. Suppl.*—*A. auritum Lamarck.*

20. *A. sorbifolium*, frondibus distinctis, pinnis oblongo-ovatis acutis serrulatis, stipitibus e surculo scandente squamosis. *Linn.*—*Plum. Fil. t. 117.*

21. *A. trifoliatum*, pinnis ternatis lanceolatis. *L.—Plum. Fil. t. 144.*
22. *A. bifurcatum*, frondibus distinctis, sterilium pinnis lineari-dichotomis, fertilium ovatis bifidis simplicibusque. —*Osmunda bifurcata Jacq. Coll. iii. t. 20. f. 2.—Pluk. Alm. t. 350. f. 4.*
23. *A. alienum*, frondibus distinctis, pinnis incisis, superioribus coadunatis decurrentibus, infimis semipinnatifidis. *Fl. Ind. Occ.—Plum. Fil. t. 10.*
- **** *fronde subbipinnata.*
24. *A. cruciatum*, pinnis oppositis lanceolatis, infimis cruciatim appendiculatis. *Linn.—Plum. Fil. t. 48. B.*
25. *A. Marantæ*, pinnulis opposito-coadunatis, subtus hirsutissimis, basi subdentatis. *Linn.—Pluk. Alm. t. 281. f. 4.*
26. *A. velleum*, pinnulis cordato-ovatis, latere incisis, subtus hirsutissimis. *Hort. Kew. iii. p. 457.*
27. *A. sulphureum*, pinnis bipinnatifidis, laciniis cuneatis retusis, apice serratis. *Fl. Ind. Occ.*
28. *A. Calomelanos*, pinnis attenuatis, pinnulis lanceolatis acuminatis inciso-serratis, fructiferis subintegris. *Linn.—Acrostichum ebencum L.—Sloan. H. 1. t. 53. f. 1. hujus junior planta.—Plum. Fil. t. 40.*
29. *A. chrysophyllum*, pinnis lanceolatis, pinnulis approximatis obtusis incisis, terminalibus coadunatis. *Fl. Ind. Occ.—Plum. Fil. t. 44.*
30. *A. tenue*, pinnulis oblongis pinnatifidis, laciniis obovatis apice crenatis. *Retz. Obs. 6.—Rumpf. Amb. vi. t. 34. f. 2.*

Inquirenda.

Acrostichum platyneuron Linn.†

..... filare *Forsk. Fl. Æg. Ar.*

..... alcicorne *Willem. in Ust. Ann. 12. 61.*

† Est *Asplenium ebencum* Hort. Kew.—Ed.

Asplenium

***Asplenium bicubitale* Petiv. Gaz. t. 47. f. 9.**

Ceterach Luzonica scandens Kam. *ibid.* t. 49: f. 4.

Asplenium Luzon. Arifolio Kam. *ibid.* t. 50. f. 12.

Filix aurea Naicensis Kam. *ibid.* t. 61. f. 3.

Polypodium parvum arb. Zapott. Kam. *ibid.* t. 61. f. 5.

..... minimum Kam. *ibid.* t. 61. f. 2.

..... phyllitis primum Kam. *ibid.* t. 61. f. 4.

..... phyllitis alterum Kam. *ibid.* t. 62. f. 8.

..... triphyllum Karo. *ibid.* t. 63. f. 9.

....., fuscum tenuissimum denticulis serratum (an
species *Onocleæ* 3. *Blechni*?) *Plum. Fil. t. 81.*

Filix scandens, pinnulis eleganter serratis Plum. Fil. t. 32.

... aurea ramosa crenulis rotundis *ibid.* t. 33.

... pinnulis undosis et ped. squamatis *ibid.* t. 49.

Lonchitis pulverulenta pinnis &c. *ibid.* t. 48. B.†

Lingua cervina scandens citri folio *ibid.* t. 111,

..... villosa major *ibid.* t. 126.

..... angustifolia *ibid.* t. 129.

Welli panna'-kelengu-Marawara *Rheede Mal. xii. t. 13.*

Avenca minor Marcgr. H. pl. 1. p. 23.

2. MENISCIUM SCHREB.

CHAR. *Capsulæ* in lunulis subparallelis venis frondis transverse interjectis.—*Indusia* nulla.

1. *M. reticulatum*, frondibus pinnatis.—Polypodium reticulatum *Linn.* Asplenium sorbifolium *Jacq. Coll. ii. t. 3. f. 2.*—*Plum. Fil. t. 107.*

2. * *M. triphyllum*, frondibus trifoliatis.*

3. HEMIONITIS LINN.

CHAR. *Capsulæ* in lineis decussatis dichotomis reticulatisve.—*Indusia* nulla.

† Jamjam supra citata ut synonymon *Acrost. cruciati*, n. 24.—ED.

* *fronde simplici.*

1. *H. lanceolata*, frondibus lanceolatis integris. *Linn.*—*Plum. Fil. t. 127.*
2. *H. reticulata*, frondibus ellipticis subfalcatis integris. *Forst.**
3. *H. palmata*, frondibus palmatis hirsutis. *Linn.*—*Phen. Fil. t. 151.*

** *fronde composita.*

4. *H. rufa*, frondibus pinnatis, pinnis oblongis subintegris pubescentibus.—*Acrostich. rufum Linn.**—*Osmunda discolor Forst. secund. Sprengel.*—*Gymnopteris Bernhardi.*—*Sloane H. 1. t. 45. f. 1.*
5. *H. acrostichoides*, frondibus pinnatis distinctis, pinnis lato-lanceolatis undulato-crenatis apice attenuatis, fructificationibus confluentibus. *Afzel.*
6. *H. japonica*, frondibus bipinnatis, pinnulis ovato-lanceolatis integris. *Thunb. Japan.*

Inquirendæ.

Hemionitis esculenta † } *Retz. Obs. 6. 38.*
 *prolifera* }

? *Kari-beli-panna-Marawara Rheede Mal. xii. t. 17. ‡*

Phyllitis amboinica Rumpf. Amb. vi. t. 37. f. 1.

4. GRAMMITIS.

CHAR. *Capsulæ* in lineolis rectis, sparsis.—*Indusia* nulla. (*Origo vocis a γραμμή, linea.*)

1. *G. linearis*, frondibus linearibus acuminatis integris, stipitibus hispidis. *Fl. Ind. Occ.*—*Asplenium angustifolium Jacq. Ic. rar. i. t. 199.*
2. *G. marginella*, frondibus lanceolato-lingulatis fuseo-

† Non est *Hemionitis*, sed speciebus *Diplazii* Sw. adjicienda erit planta *Retzii.*—Ed.

‡ Est *Aspidium parasiticum.*—Ed.

marginatis,

marginatis, stipitibus brevissimis subciliatis. *Fl. Ind. Occ.*—*Polypodium marginellum Prodr.*

3. **G. lanceolata*, frondibus lanceolatis acuminatis basi attenuatis, lineolis fructiferis costa subparallelis.*

4. *G. serrulata*, frondibus linearibus dentatis e surculo radicante.—*Acrostichum serrulatum Prodr.*

5. *G. graminoides*, frondibus linearibus superne indivisis dichotomisque, lineola fructifera terminali unica.—*Acrost. graminoides Prodr.*

6. *G. myosuroides*, frondibus pinnatifidis, lacinulis semi-ovatis obtusis, superioribus in apicem linearem fructiferam coadunatis. *Fl. Ind. Occ.*—*Polypod. myosuroides Prodr.*

Dubia.

Blechnum seminudum Willden. Phyt. 1. t. 8. f. 2.

5. POLYPODIUM LINN.

CHAR. *Capsulæ* in puncta subrotunda sparsa congestæ, absque *Indusio*.

* *fronde simplici*.

1. *P. piloselloides*, frondibus integris hirtis, sterilibus ovatis, fertilibus lanceolatis, punctis fructiferis solitariis, surculo radicante. *Linn.—Plum. Fil. t. 118.*

2. *P. lycopodioides*, frondibus lanceolatis integris glabris, punctis solitariis, surculo squamoso radicante. *Linn.—Plum. Fil. t. 119.*

3. *P. stellatum*, frondibus lanceolato-linearibus obtusis integris subtus incanis, punctis solitariis, surculo hirsuto radicante. *Vahl. Symb. 3.*—*P. serpens Forst. Austr.*—*P. stoloniferum Gmel.*

4. *P. serpens*, frondibus lanceolato-linearibus subundulatis glabris, punctis solitariis, surculo hirsuto radicante. *Flor. Ind. Occ.—Plum. Fil. t. 121.*

5. *P. heterophyllum*, frondibus crenatis glabris, sterilibus subrotundis sessilibus, fertilibus lanceolatis, punctis solitariis, surculo radicante. *Linn.—Plum. Fil. t. 120.*
6. *P. lanceolatum*, frondibus lanceolatis integris glabris, punctis solitariis. *Linn.—Plum. Fil. t. 137.*
7. **P. simplex*, frondibus elliptico-lanceolatis integris subrepandis glabris, punctis solitariis.*
8. *P. angustifolium*, frondibus lineari-lanceolatis longissimis rigidis margine convexis, punctis solitariis. *Fl. Ind. Occ.*
9. *P. lineare*, frondibus lineari-lanceolatis furcatisve glabris, punctis solitariis. *Thunb. Ic. Japon. dec. 2.*
10. *P. surinamense*, frondibus linearibus remote-serrulatis glabris, punctis solitariis. *Jacq. Coll. 3. t. 21. f. 4.*
11. *P. crassifolium*, frondibus lato-lanceolatis glabris integris, punctis serialibus. *Linn.—Plum. Fil. t. 123.*
12. *P. immersum*, frondibus oblongo-lanceolatis oblongisve obtusis basi acutis, integris glabris, punctis serialibus immersis. *Vahl. Symb. 3.*
13. *P. phyllitidis*, frondibus lanceolatis glabris integris marginatis, punctis sparsis. *Linn.—Plum. Fil. t. 130.*
14. *P. ensatum*, frondibus elliptico-ensiformibus glabris margine integro repandove, punctis sparsis. *Thunb. in Act. Soc. Linn. 2. p. 341.—P. phyllitis Thunb. Fl. Jap.*
15. *P. repens*, frondibus lanceolatis acuminatis integris glabris, venis undulatis, punctis sparsis. *Fl. Ind. Occ.—Plum. Fil. t. 134.*
16. *P. plantagineum*, frondibus lanceolato-oblongis integris venosis glabris, punctis sparsis. *Jacq. Coll. 2. t. 3. f. 1.*
17. *P. acrostichoides*, frondibus lineari-lanceolatis subtus incano-tomentosis e surculo squamoso radicante, punctis confertis. *Forst. Austr.—Acrostichum lanceolatum L.—Rheede Mal. xii. t. 74.*
18. **P. stigmosum*, frondib. lanceolato-oblongis acuminatis integris punctatis, punctis fruct. contiguis sparsis tomento ferrugineo

ferrugineo involutis, surculo radicante.* *Petiv. Gaz.*
t. 61. f. 3.?

19. **P. polycarpon*, frondibus lanceolato-oblongis acuminatis integris, subtus reticulato-venosis, punctis contiguis sparsis.*

20. *P. punctatum*, frondibus cordato-lingulatis acuminatis integris, supra punctatis, punctis fruct. contiguis.—*Acrostichum punctatum* L.†

21. *P. tricuspe*, frondibus hastatis, lobo medio lanceolato, punctis sparsis tomento incano involutis. *Acrostichum hastatum*. *Thunb. Jap.*

22. *P. comosum*, frondibus lanceolatis integris glabris apice multifidis, punctis sparsis. *Linn.—Plum. Fil. t. 131.*

23. *P. trifurcatum*, frondibus lanceolatis glabris repando-sinuatis apice trilobis. *Linn.—Plum. Fil. t. 138.*

24. *P. hastatum*, frondibus oblongis hastatis 3-lobisve, punctis solitariis. *Thunb. Fl. Jap.*

25. *P. phymatodes*, frondibus simplicibus trifidis 5-lobisve, laciniis lanceolatis, punctis subsparsis. *Linn.—P. acutum* *Burm. Zeyl.* *P. scolopendria* *Burm. Ind.—Jacq. Ic. rar.*

** *fronde pinnatifida.*

26. *P. ensiforme*, frondibus trifidis pinnatifidisve, laciniis linearibus obtusis, punctis solitariis. *Thunb.—P. triphyllum* *Jacq. Coll. 2. 284. t. 22. f. 4.*

27. *P. scandens*, frondibus pinnatifidis, laciniis linearibus obtusis undulatis remotis, stolonibus paleaceis radican-
tibus. *Forst. Austr.**

28. *P. pustulatum*, laciniis oblongis acuminatis integris, terminalibus sensim minoribus. *Forst. Austr.**

29. *P. aureum*, laciniis oblongis distantibus venosis, infimis patulis, terminali maxima. *L.—Plum. Fil. t. 76.*

30. *P. quercifolium*, frondib. fructiferis pinnatifidis, laci-

† *Meniscii* species esse videtur : aliam præterea speciem sub nomine *Polyp. punctati* invenimus infra, n. 73.—Ed.

- niis lanceolatis, sterilibus sessilibus ovatis sinuatis. *L.—Rumpf. Amb. ix. 78. t. 36.*
31. *P. crispatum*, laciniis semiorbiculatis crenatis. *L.—Plum. Fil. t. 102. B.*
32. *P. suspensum*, laciniis semiovatis acutiusculis. *L.—Plum. Fil. t. 87.*
33. *P. asplenifolium*, laciniis semiovatis obtusis pilosis, basi deorsum falcatis. *L.—Plum. Fil. t. 102. A.*
34. *P. scolopendroides*, laciniis obtusiusculis, infimis remotis. *L.—Pluk. Alm. t. 290. f. 1.*
35. *P. incisum*, laciniis omnibus coadunatis apice rotundatis, fronde sessili. *Flor. Ind. Occ.—Plum. Fil. t. 91.*
36. *P. pendulum*, laciniis oblongis obtusis, fronde laxa sessili. *Fl. Ind. Occ.*
37. *P. trichomanoides*, laciniis semiovatis obtusis subpilosis, puncto fructifero unico, fronde sessili. *Fl. Ind. Occ.*
38. *P. vulgare*, laciniis lineari-oblongis obtusis subserratis, radice squamata. *L.—Flor. Dan. t. 1060. (P. cambricum L. est frons monstrosa hujus speciei. Smith.)*
39. *P. virginianum*, laciniis oblongis obtusis subserratis, radice lævi. *L.—Plum. Fil. t. 77.*
40. *P. Otites*, laciniis alternis lanceolatis obtusis remotiusculis. *L.—Plum. Fil. t. 85.*
41. *P. pectinatum*, laciniis approximatis parallelis ensiformibus acutis horizontalibus, radice nuda. *L.—Plum. Fil. t. 83.*
42. *P. taxifolium*, laciniis approximatis parallelis ensiformibus acutis adscendentibus, radice hirta. *L.—Plum. Fil. t. 89.*
43. *P. struthionis*, laciniis approximatis ensiformibus repandis horizontalibus. *L.—Plum. Fil. t. 82.*
44. *P. curvatum*, laciniis lineari-lanceolatis subfalcatis adscendentibus remotis, fronde sessili. *Flor. Ind. Occ.*
45. *P. squamatum*, laciniis lanceolatis horizontalibus distantibus scabris. *Linn.—Plum. Fil. t. 79.*

46. *P. loricum*, laciniis lanceolatis repandis horizontalibus distantibus lævibus. *L.—Plum. Fil. t. 78.*

47. *P. incanum*, laciniis lanceolatis obtusis integris patentibus subtus stipitibusque squamulosis. *Fl. Ind. Occ.—Acrost. polypodioides L.—Pluk. Alm. t. 289. f. 1.*

*** *fronde pinnata.*

48. *P. hastæfolium*, pinnis lanceolatis obtusis integris basi utrinque unidentatis, inferioribus triangularibus minutis. *Fl. Ind. Occ.—P. sagittatum Prodr.*

49. *P. reptans*, pinnis subcordatis ovatis obtusis crenatis basi subauriculatis, fronde repente apice radicante. *P. repens Prodr.—Pluk. Alm. t. 286. f. 2.*

50. *P. serrulatum*, pinnis lanceolatis subattenuatis dentato-serratis, basi obtusangulis, punctis solitariis. *Flor. Ind. Occ.—Sloane Hist. i. t. 43. f. 1.*

51. *P. repandum*, pinnis ovatis obtusis, margine convexis repandis pubescentibus, punctis solitariis. *Fl. Ind. Occ.*

52. *P. asplenoides*, pinnis lanceolatis obtusis crenatis basi subcordatis, punctis sparsis. *Fl. Ind. Occ.—Sloane H. 1. t. 43. f. 2.*

53. *P. oblitteratum*, pinnis lato-lanceolatis attenuatis crenatis, crenis apicis et baseos oblitteratis. *Fl. Ind. Occ.*

54. *P. crenatum*, pinnis suboppositis oblongo-lanceolatis crenato-serratis, punctis sparsis. *Fl. Ind. Occ.—Plum. Fil. t. 111.*

55. **P. rigidulum*, pinnis lanceolatis obtusis serratis reticulato-venosis, punctis solitariis.*

56. **P. triseriale*, pinnis lato-lanceolatis acuminatis integris basi rotundatis venosis, punctis fructif. ordine triplici longitudinali.*

57. **P. tæniatum*, pinnis elliptico-lanceolatis acuminatis integris, punctis solitariis.*

58. *P. tenellum*, pinnis remote alternis lanceolato-attenuatis undulatis, surculo radicante. *Forst.**

59. *P. fraxinifolium*, pinnis lanceolatis acuminatis undulatis

latis transversim lineatis. *Jacq. Ic. rar. iii. 639.* forte varietas *P. obliterati*.

60. *P. dissimile*, pinnis lanceolatis acutis pubescentibus apice confluentibus, inferioribus distinctis adnatis. *Linn.* — *Pluk. Alm. t. 288. f. 1.*

**** *fronde bipinnatifida et bipinnata.*

61. *P. hyperboreum*, frondib. subbipinnatifidis subtus hirtis, pinnis cuneatis 3—5-lobatis, lobis crenulatis, punctis confluentibus.—*Acrostichum alpinum Bolton.*—*Liljebl. Sv. fl. 2.*—*Acrostichum hyperboreum Liljebl.*—*Act. Holm. †*
62. *P. iluense*, frondibus bipinnatifidis, pinnis oblongis obtusis subtus hirtis, laciniis ovatis integris, punctis submarginalibus confluentibus.—*Acrostichum iluense Linn.* — *Polypod. Marantæ Hoffm.*
63. *P. latifolium*, frondibus bipinnatis, pinnulis pinnatifidis lobatisve, lobis repandis crenatis, stipite glaberrimo nitido. *Forst.**
- † 64. *P. leptophyllum*, frondibus bipinnatis glaberrimis, pinnulis cuneiformibus rotundato-lobatis, puncto fructifero singulis lobis oblongo. *Linn.*—*Magnol. monop. 5.*—*Barrel. rar. t. 431. caule aruoso*—
65. *P. sanctum*. frondibus bipinnatis, pinnis lineari-lanceolatis, pinnulis superioribus coadunatis, inferioribus linearibus obtusis crenatis. *Flor. Ind. Occ.*—*Acrostichum sanctum L.*—*Pluk. Alm. t. 283.*
66. *P. phegopteris*, frondibus subbipinnatis subtus hirtis, pinnis terminalibus confluentibus, infimo pari deflexo, pinnulis baseos rhombeis rachi adnatis. *Linn.*—*Bolton Fil. t. 20.*
67. *P. lunulatum*, frondibus bipinnatis, pinnis apice serratis setaceis, pinnulis lineari-oblongis falcatis, stipite aspero. *Forst.**
68. *P. glaucum*, frondibus bipartitis bipinnatifidis subtus

† Est *Polypod. arvanicum* Smith Fl. Brit. p. 1115.—Ed.

glaucis, pinnis ensiformibus, laciniis lanceolatis obtusis integris. *Thunb. Fl. Jap.*

69. *P. dichotomum*, frondib. dichotomis subbipinnatis subtus glaucis, pinnulis lanceolatis integris parallelis, infimis subpinnatifidis deflexis. *Thunb.*—Polypod. lineare *Burm. Ind. t. 67. 4.*—*Thunb. Fl. Jap. 338. t. 37.*

70. *P. furcatum*, frondibus dichotomis subbipinnatis infra dichotomias semipinnatis, pinnulis lineari-lanceolatis integris parallelis. *Fl. Ind. Occ.*—Acrostich. furcatum *L.*—*Plum. Fil. t. 28.*

**** fronde supradecomposita.

71. *P. armatum*, foliolis subbipinnatis, pinnulis basi coadunatis linearibus crenulatis subtus hirsutis, punctis fructif. confertis, caudice arboreo aculeato. *Fl. Ind. Occ.*

72. *P. pruinatum*, foliolis tripinnatifidis subtus glaucis, pinnis pinnulisque lanceolatis, laciniis ovatis acutis, caudice arborescente. *Fl. Ind. Occ.*—*P. glaucum Prodr.*

73. *P. punctatum*, foliolis bipinnatifidis, pinnis lanceolatis obtusis, laciniis ovatis obtusiusculis apice serrulatis, stipite punctato subvillosa. *Thunb. Fl. Jap.*

74. *P. effusum*, foliolis 3-pinnatifidis membranaceis, pinnis pinnulisque lanceolatis, laciniis serrulatis, rachi marginata. *Fl. Ind. Occ.*—*P. multifidum Jacq. Ic. rar.*

75. *P. Dryopteris*, foliolis ternis bipinnatis. *L.*

6. ASPIDIUM.

Char. *Capsulæ* in puncta subrotunda sparsa digestæ, *Indusiis* umbilicatis s. dimidiatis tectæ. (*Nomen ex Ἀσπίς, Clypeus, Scutum; Ἀσπίδες, in Clypei modum rotundus, s. Ἀσπίζω, Clypeo protego.*)

* fronde simplici.

1. **A. articulatum*, frondibus ellipticis glaberrimis punctis, fructif. catenulatis sparsis, stipitibus articulatis e stolone repente.* *Plum. Fil. t. 136.*

2. **A. pistillare*,

2. * *A. pistillare*, frondibus lanceolatis acuminatis glaberrimis, punctis fructif. solitariis, stipitibus articulatis e stolone scandente ramoso.*

** *fronde trifoliata*.

- X 3. *A. trifoliatum*, frondib. simplicibus cordato-trilobis ternatisve, intermedio majore, lateralibus basi auriculatis. *Lin.*—*Plum. Fil. t.* 148.—*Polypod. Pica Lin. Suppl. var. fronde simplici.*

*** *fronde pinnata*.

4. *A. Lonchitis*, pinnis lunulatis ciliato-serratis, stipite strigoso. *Polyp. Lonchitis L.*—*Fl. Dan. t.* 497.—*Jacq. Coll. 3. t.* 22. *f.* 1.
5. *A. mucronatum*, pinnis subfalcatis serrulatis basi sursum auritis apiceque spinulosis, stipite rachive squamoso hirsuto. *Fl. Ind. Occ.*—*Polyp. muricatum Prodr.*—*Sloane H. 1. t.* 36. *f.* 4. 5.
6. *A. falcatum*, pinnis lato-cordatis falcatis acuminatis integris, stipite squamoso.—*Polyp. falcatum Thunb. Fl. Jap. t.* 3. 5.—*P. japonicum Houtt. H. ii. t.* 98. *f.* 3.
7. *A. trapezoides*, pinnis trapezio-oblongis crenato-serrulatis striatis glabris basi sursum acutis, stipite squamuloso. *Fl. Ind. Occ.*
8. *A. triangulum*, pinnis acute triangularibus dentatis, punctis fructif. solitariis.—*Polypod. triangulum L.*—*Plum. Fil.* 72.
9. *A. auriculatum*, pinnis falcato-lanceolatis subserratis, basi truncatis, sursum auritis, terminalibus fructiferis. *Polyp. auriculatum L.*—*Burm. Zeyl. t.* 44. *f.* 1.
10. *A. rhizophyllum*, pinnis ovato-deltoides, superioribus confluentibus in laciniam attenuatam fructiferam radican-tem.—*Polyp. rhizophyllum Fl. Ind. Occ.*
11. *A. semicordatum*, pinnis lanceolatis parallelis subintegris, basi oblique cordatis, lobo inferiore gibbosiore, punctis

punctis fructif. quadriserratis. *Fl. Ind. Occ.*—*Plum. Fil.* t. 113.

12. *A. exaltatum*, pinnis lanceolatis subfalcatis basi cordatis sursum gibbis subserrulatis, punctis solitariis.*—*Polypod. exaltat. Linn.*—*Plum. Fil.* t. 63.—*Davallia falcata Smith?*
13. *A. cordifolium*, pinnis parallelis oblongis obtusis obsolete serratis basi subcordatis sursum gibbosisioribus, punctis solitariis, rachì subpubescente.*—*Polyp. cordifol. L.*—*Plum. Fil.* t. 71.
14. * *A. undulatum*, pinnis lanceolatis falcatis basi cordatis sursum auritis margine remote crenatis undulatis, punctis solitariis. *Afzel.*
15. *A. hirsutulum*, pinnis oblongis lanceolatis obtuse serratis basi sursum auriculatis, punctis solitariis, costa stipiteque villosis. *Forst.**
16. * *A. biserratum*, pinnis cordato-ensiformibus basi deorsum subauritis margine obtuse serratis, serraturis bidentatis, punctis versus marginem solitariis.*
17. *A. unitum*, pinnis ensiformibus subpinnatifidis, laciniis (serraturis) semiovatis obtusis nervosis, nervis rachive pubescentibus.—*Polyp. unitum L.*—*Polyp. acuminatum Houytt.*—*Burm. Zeyl.* t. 44. f. 1.
18. *A. serra*, pinnis ensiformibus subpinnatifidis attenuatis, laciniis semiovatis acutis nervosis. *Fl. Ind. Occ.*—*Polyp. serra Prodr.*
19. *A. pteroides*, pinnis ensiformibus remotiusculis subpinnatifidis, laciniis (serraturis) ovatis acutis, utrinque rachive glabris, punctis fructif. submarginalibus.—*Polyp. pteroides Retz. Obs.* 6.
20. * *A. Davallioides*, pinnis lanceolatis apice attenuatis subpinnatifidis, laciniis remotiusculis obtusis, puncto fructif. solitario terminatis.*—*Ophiogloss. acuminatum Houytt. N. H. ii.* 14. t. 94. f. 3.
21. *A. tetragonum*, pinnis pinnatifidis lanceolatis horizontalibus

- talibus remotis, laciniis ovatis obtusiusculis, stipite tetragono. *Fl. Ind. Occ.*—Polyp. tetragonum *Prodr.*
22. *A. sophoroides*, pinnis ensiformibus subpinnatifidis, laciniis ovatis subfalcatis acutis, infimis longioribus.—Polyp. *sophoroides Thunb. Act. S. Linn. ii. 241.*—*P. unitum Thunb. Fl. Jap.*
23. * *A. obtusatum*, pinnis ensiformibus sinuato-pinnatifidis, laciniis oblongatis obtusis.*
24. *A. attenuatum*, pinnis lanceolato-linearibus subpinnatifidis attenuatis, laciniis ovatis acutis antrorsum falcatis.*—Polyp. dissectum *Forst.*
25. *A. invisum*, pinnis lineari lanceolatis pinnatifidis glabris, laciniis lanceolato-falcatis, infimis fere brevioribus. *Fl. Ind. Occ.*—Polyp. *invisum Prodr. Sloane H. 1. t. 51.*
26. *A. patens*, pinnis lineari-lanceolatis pinnatifidis attenuatis subtus pubescentibus, laciniis oblongis acutis, bases longioribus. *Fl. Ind. Occ.*—Polyp. *patens Prodr.*—*P. nymphaeale Forst.*—*Sloane H. 1. t. 52. f. 1.*
27. *A. pennigerum*, pinnis lineari-lanceolatis attenuatis glabris pinnatifidis, laciniis ovato-oblongis obtusis, infimis æqualibus.—Polyp. *pennigerum Forst.*
28. *A. deltoideum*, pinnis inferioribus abbreviatis oblongis triangularibus integris reflexis. *Fl. Ind. Occ.*—Polyp. *deltoideum Prodr.*
29. *A. molle*, pinnis lanceolato-acuminatis pinnatifidis utrinque villosis, laciniis oblongis obtusis integris, infimis subæqualibus.—Polyp. *molle Jacq. Ic. rar.*
30. *A. parasiticum*, pinnis lanceolato-acutis pinnatifidis utrinque pubescentibus, laciniis oblongis obtusis integris, infima superiore rotundata majore.—Polyp. *parasit. L.*
31. *A. Oreopteris*, pinnis lanceolatis subpinnatis, laciniis lanceolatis obtusiusculis integris, infimis longioribus, punctis fructif. submarginalibus. *Ehrhart.*—Polyp. *montanum Vogl.*—*P. limbospermum Bellard.*—*P. pteroides Villars.*—*Fl. Dan. t. 1121.*

32. * *A. lim-*

32. **A. limbatum*, pinnis lanceolatis acuminatis subpinnatis, laciniis oblongis serratis, infimis auriculatis, serraturis fructiferis.*
33. *A. marginale*, pinnis subpinnatis glabris, laciniis oblongis integris, basi sinuato-repandis, punctis marginalibus.—*Polypodium marginale* L.
34. *A. fragrans*, pinnis approximatis subpinnatis, laciniis obtusis serratis, indusiis fruct. imbricatis, stipite paleaceo.—*Polypodium fragrans* L.
35. *A. varium*, pinnis subpinnatis, terminalibus simplicibus, infimis basi bipinnatifidis.—*Polypod. varium* L.
36. *A. coriandrifolium*, pinnis cordato-oblongis pinnatifidis, laciniis obtusis crenato-repandis pubescentibus. *Fl. Ind. Occ.—Pluk. Alm. t. 284. f. 5.*
37. *A. cicutarium*, frondibus ternatis, foliolis bipinnatifidis, pinnis decurrentibus, terminalibus confluentibus, infimis lateralium basi bipinnatifidis elongatis, laciniis lobato-incisis crenatis.*—*Polyp. cicutarium* L.—*Pluk. Alm. t. 289. f. 4.*—*Polyp. Hippocrepis* Jacq. *Ic. rar. Coll. 3. hujus junior planta s. varietas videtur.*
38. **A. protensum*, frondibus ternatis, foliolis bipinnatifidis, laciniis obovatis obsolete crenatis, pinnis baseos fol. lateral. deorsum longioribus. *Afzelius.*

*** fronde 2—3-pinnata.

a. indusiis dimidiatis reniformibus.

39. **A. truncatulum*, pinnis ensiformibus pinnatis, pinnulis rhombeo-ovatis margine integro subundulato sursum versus fructiferis.*—*Adiant. lunulatum* Houytt. *N. H. ii. 14. t. 100. f. 1.*
40. *A. cristatum*, pinnis subpinnatis cordato-oblongis, pinnulis ovatis obtusis incisis denticulato-serrulatis, fronde lanceolato-ovata, stipite paleaceo.*—*Polyp. cristatum* L. *Afzel.—P. Callipteris Ehrh. Act. Holm. 1787. t. 9.*
41. *A. rigidum*, pinnis bipinnatifidis cordato-lanceolatis,

- laciniis oblongis obtusis apice dentatis, fronde ovato-lanceolata, stipite strigoso.—Polypod. rigidum *Hoffm.*
42. *A. aculeatum*, pinnis pinnatis, pinnulis lunulatis mucronato-dentatis, stipite strigoso.—Polyp. aculeatum *L.*—*P. setiferum* *Forsk.*—*Pluk. Ph. t.* 180. 1—3.—*Moris. H.* 5. 14. *t.* 3. *f.* 15.
43. *A. lobatum*, pinnis pinnatis approximatis, pinnulis rhombeo-ovatis acutis serrato-spinulosis, stipite rachive paleaceo.—Polypodium lobatum *H. Kew.*
44. *A. aristatum*, pinnis pinnatis, pinnulis rhombeo-oblongis incisiss, laciniis mucronato-serratis, stipite villosiusculo.—Polypodium aristatum *Forst.**
45. *A. vestitum*, pinnis pinnatis, pinnulis rhombeo-ovatis mucronulatis inciso-serratis, infimis subpinnatis, stipite rachidibusque scarioso-squamosis.—Polypod. vestitum *Forst.**
46. **A. drepanum*, pinnis remotis alternis, pinnulis suboppositis lanceolato-falcatis inciso-denticulatis basi sursum obtuse auritis, stipite rachibusque paleaceis.*
47. *A. spinulosum*, pinnis pinnatifidis bipinnatisve, laciniis oblongis acutis mucronato-serratis, fronde ovato-triangulari, stipite paleaceo.—Polyp. spinulosum *Retz.*—*P. cristatum* vulgo *Müller Fl. Friedrichsd. f.* 2.—*Fl. Dan.* 707. 759. *male.*—*P. dilatatum* *Hoffm.*—*Polystichum spinosum et multiflorum* *Roth.*
48. *A. Filix mas*, pinnis pinnatis, pinnulis oblongis crenatis apice serratis, stipite paleaceo.—Polypod. Filix mas *L.*—*Lobel. Ic. p.* 812.
49. *A. noveboracense*, pinnis pinnatis, pinnulis oblongis integerrimis parallelis, stipite lævi.—Polypod. noveboracense *Linn.*
50. *A. elongatum*, pinnis pinnatis inferne bipinnatifidis, pinnulis lanceolatis obtusis, laciniis ovatis denticulatis.—Polypod. elongatum *H. Kew.*
51. *A. lacerum*, pinnis pinnatis, pinnulis falcato-lanceolatis, infimis subauriculatis subserratis, superioribus confluentibus,

fluentibus, stipite squamoso.—Polypod. lacerum *Thunb. Fl. Jap.*

52. *A. pubescens*, pinnis pinnatis pilosis, pinnulis lanceolato-ovatis subincisis acutis, extimis confluentibus.—Polypod. pubescens *Linn.*

53. *A. setosum*, pinuis bipinnatifidis, pinnulis lanceolatis, laciniis ovato-acutis, stipite rachibusque setosis.—Polypod. setosum *Thunb. Fl. Jap.*

54. *A. villosum*, decompositum, foliolis bipinnatis hirsutis, pinnulis oblongis obtusis, terminalibus acuminatis, inferioribus subpinnatifidis, laciniis ovatis.—Polypod. villosum *L.—Plum. Fil. t. 27.*

55. *A. hirtum*, decompositum, foliolis oppositis oblongis acuminatis subbipinnatis, pinnis alternis, pinnulis ovatis, inferioribus incisis, stipite hirtum.—Polyp. hirtum *Prodr.*

56. **A. hispidum*, decompositum, foliolis subbipinnatis attenuatis hirtis, pinnis marginatis, pinnulis lanceolatis inciso-serratis, stipite hispido setoso.*

57. *A. denticulatum*, supradecompositum, foliolis subquadripinnatis glabris, pinnulis cuneato-ovatis incisis denticulato-spinulosis. *Flor. Ind. Occ.—Polyp. denticulatum Prodr.*

58. *A. coriaceum*, decompositum, foliolis coriaceis glabris pinnatis, pinnis oblongo-lanceolatis inferne pinnatifidis, laciniis ovatis, infimis discretis crenatis, stipite aspero. *Fl. Ind. Occ.—Polypod. coriaceum Prodr.—P. adiantiforme Forst. est hujus varietas minus divisa.*

b. *indusiis lateralibus.*

59. *A. Thelypteris*, pinnis subpinnatis, pinnulis basi coadunatis ovatis obtusis integris, punctis confluentibus.—Polypod. Thelypteris *L.—Fl. Dan. t. 760.*

60. *A. fontanum*, pinnis subpinnatis alternis triangularibus obtusis, lobis apice argute dentatis.—Polyp. fontanum *L.—Pluk. Ph. t. 89. f. 3.—Barrel. rar. t. 432. f. 1.*

61. *A. fragile*, pinnis bipinnatifidis oppositis, pinnulis

- ovatis incis, lacinulis obovatis dentatis.—Polyp. fragile L.—*Cyathea fragilis* Sm.—Polyp. dentatum Dicks.—P. anthriscifol. cynapifol. Hoffm.—Fl. Dan. t. 401.
62. *A. trifidum*, pinnis bipinnatifidis remotis triangularibus, pinnulis ovatis lobatis, inferioribus trifidis, laciniiis obovatis obtuse dentatis.—Polypod. trifidum Withering.—*Cyathea incisa* Sm.—Eng. Bot. 163.
63. *A. regium*, pinnis pinnatis remotis, pinnulis ovatis acutis obtuse laciniatis, rachi alata.—Polyp. regium L.—Vaill. Paris. t. 9. f. 1.
64. *A. rheticum*, pinnis pinnatis pinnulisve remotis oblongis acuminatis argute serratis, rachi alata.—Polypodium rheticum Linn.
65. *A. bulbiferum*, pinnis pinnatis remotiusculis, pinnulis oblongis serratis subtus bulbiferis, infimis pinnatifidis.—Polypod. bulbiferum L.—Moris. H. 14. t. 13. f. 10.
66. *A. Filix femina*, pinnis pinnatifidis pinnulisque lanceolatis, lacinulis acutis apice bidentatis.—Polyp. F. fem. L.—P. molle Schreb. All., P. trifidum, incisum Hoffm. hujus varietates.—Pluk. Phyt. t. 180. f. 4.—Moris. Hist. 3. 14. t. 3. f. 8.—Müll. Fl. Fridrichsd. t. 2. f. 3, 4.
67. *A. umbrosum*, pinnis bipinnatifidis oppositis, pinnulis ovatis acuminatis, laciniiis oblongis obtusis serratis.—Polypod. umbrosum Hort. Kew.
68. *A. axillare*, pinnis bipinnatifidis alternis, pinnulis lineari-lanceolatis apice serratis.—Polypodium axillare Hort. Kew.
69. *A. æmulum*, decompositum triangulare, foliolis tripinnatifidis, pinnulis oblongo-linearibus incis, laciniiis apice denticulatis.
70. *A. alpinum*, decompositum, foliolis tripinnatis pinnisque remotis, pinnulis cuneato-obovatis incis, lacinulis obtusis subbifidis.—Polyp. alpinum Jacq. Ic. rar.—P. crispum Gouan Obs.—Seguier Veron. suppl. t. 1. f. 3.
71. *A. capense*, decompositum, foliolis subbipinnatis, costis marginatis, pinnis laciniiisque sessilibus lanceolatis serratis,

ratis, punctis fructif. ad basin subsolitariis.—Polypod. capense *L.*—*Cyathea capensis Sm.*

72. *A. montanum*, supradecompositum, foliolis ternis tripinnatifidis, lacinulis subfalcatis obtusis apice dentatis.—Polyp. montanum *All. Ped.*—*P. myrrhidifolium Jacq.*—*Cyathea montana Sm.*—*Pluk. Fil. t. 89. f. 4.*

Species dubiæ

Generis POLYPODII aut ASPIDIUM.

Polypod. adiantoides *Burm. Ind.*

————— *Aubl. Guian.*

————— alatum *Linn.*

————— arboreum *Loureiro.*

————— asplenioides *Scop. Carn.*

————— austriacum *Jacq. Austr.*

————— Barometz *Linn.*—*Loureiro.*

————— biforme *Loureiro.*

————— Blechnoides *Act. S. H. Nat. Paris. 1.*

————— campestre *Rumpf. Amb. vi. t. 34. f. 2.†*

————— carthusianum *Villars Delph.*

————— decussatum *Linn.‡*

————— dentatum *Forsk.*

————— elasticum *Act. S. H. Nat. Paris. 1.*

————— ellipticum *Thunb. Jap. (fructificatio ignota.)*

————— fontanum *Leers.*

————— fumarioides *Hoffm. (var. A. fragilis?)*

————— glabrum *Burm. Ind.*

————— guianense *Aubl. Guian.* non Polypodium si
figura *Plum. Fil. t. 117.* hujus est, quæ
Acrost. sorbifolii L. §

† Supra citatum pro *Acrost. tenui* p. 428. n. 30.—*Ed.*

‡ Est vera Polypodii species, cujus optimum characterem suppeditat stipulatio. Vid. *Plum. Fil. tab. 24 et 25.*—*Ed.*

§ Exemplar plantæ Aubletianæ in Herbario Banksiano, etsi fructificatione destitutum, eam ab *Acrost. sorbifolio* diversam indicit, habitu vero illi non absimilem.—*Ed.*

Polypod. Halleri Roth sub Athyrio.

———— laciniatum Burm. Ind. vix filix : cfr. fig. citatam.†

———— lignosum Burm. Ind.

———— microcarpum Willemet ap. Usteri Ann.

———— muricatum Linn.

———— ovatum Burm. Ind.

———— palustre ——— Zeyl.—Pluk. t. 286. f. 3.‡

———— pectinatum Forskål.

———— pedicularis Willemet ap. Usteri.

———— pedicularifolium Hoffm. (var. A. fragilis?)

———— Pontederæ Allion. Pedem.

———— pulchellum Willemet ap. Usteri.

———— pyramidale Linn.§

———— radicans Burm. Ind.

———— repandum Lour. Coch.

———— retroflexum Linn.

———— rigidum Aubl. Guian.

———— rostratum Burm. Ind.

———— serratum Aublet. Guian.

———— simile Linn.||

———— simplex Burm. Ind.

———— Speluncæ Linn.

———— spinulosum Burm. Ind.

———— tanacetifolium Hoffm. (var. A. spinulosi?)

———— tollum Thunb. Prodr. Cap.

———— trapezoides Burm. Ind. (Pteridis species?)

———— trilobum Houytt. N. H. ii. t. 98. f. 1.

† Figura a Burmanno citata certe est Dracontii (*D. pertusi* aut affinis); nec absonum Cel. Dryandri monitum, autorem Floræ Indicæ de foliis radicalibus *Acrost. alciiformis* cogitasse.—Ed.

‡ *Polyp. palustre* non invenimus in Burmanni Flora Zeylanica; Plukenetii vero synonymon ad *Acrostichum sorbifolium* pertinet.—Ed.

§ Est *Adianti* species adumbrata in Plum. Fil. tab. 54.—Ed.

|| Vera est *Polypodii* species *aureo* affinis.—Ed.

Polypod. varium Loureiro Coch.

- *venosum* —————
- *vesiculiferum Act. Par. H. N. 1. (forsan Cyathea.)*
- *Villarsii Bellard. (affine A. fragrantis.)*
- *majus serrato folio Barrel. rar. Ic. 38.*
- *Viterbiense* ————— 1110.†
- *pendulum hirsutie ruffa Plum. Fil. t. 88. (forte*
var. *P. Asplenifolii.)*

———— *aliud pendulum minus ibid. t. 87.*

Hemionitis maxima Ling. cerv. aff. Plum. Fil. t. 145.

———— *trifolia, villis tenuibus, ibid. t. 149.*

———— *laciniis crispis incisa ibid. t. 150.*

———— *varia et cuspidata ibid. t. 153.*

Lingua cervina dentata, punctis nigris ibid. t. 112.

———— *foliis ensiformibus serratis ibid. t. 113.*

———— *5-folia foliis acuminatis ibid. t. 114.*

———— *ramosa fol. querni divisura ibid. t. 122.*

———— *longis et angustis foliis ibid. t. 127.*

———— *latifolia pediculis squamosis ibid. t. 128.*

———— *crassiore et brevior folio ibid. t. 142‡.*

Lonchitis pinnulis rotundis non dentatis ibid. t. 47.

———— *ramosis et cauliculis squamosis § ibid. t. 56.*

———— *in auriculas subrotundas divisa ibid. t. 57.*

———— *auriculata et serrata ibid. t. 62.*

———— *Betonicae foliis ibid. t. 64.*

———— *Asplenii facie pinnulis variis Sloane H. 1. t. 29. ||*

Filix aculeata repens Plum. Fil. t. 42.

† *Polypodii vulgaris* variet. esse videtur.—Ed.

‡ *Polypod. plantagineo* non absimilis.—Ed.

§ Si acervulorum formam plus minus rotundam aut ovalem respexeris, *Aspidio*, si indusia geminata, *Diplazio* Sw. hanc filicem adjicies.—Ed.

|| Tabulae xxixae exemplaris libri supra citati, in Bibliotheca Banksiana asservati, lineae Perill. possessoris autographae adjectae sunt, monentes figuram hanc, ad exemplar siccum Herbarii Sloanei delineatam, duas filicum species radice unitas exhibere: alteram minus notam; alteram (foliis minoribus) *Polypod. repentem* Sw.—Ed.

- Filix latifolia* pinnulis acuminatis *Plum. Fil. t. 16.*
 — ramosa, latius dentata major *ibid. t. 21.*
 — ramosa, latius dentata altera *ibid. t. 22.*
 — taxiformis major *ibid. t. 24.* }
 — — minor *ibid. t. 25.* } †
 — pinnulis oblongis in summitate serratis *ibid. t. 26.*
 — hirsuta et lutescente pulvisculo &c. *ibid. t. 34.*
 — ramosa, pinnulis rostratis *ibid. t. 35.*
 — ramosissima, cicutæ foliis *ibid. t. 36.*
 — non ramosa, pinnulis rotundis *ibid. t. 38.*
 — spinulis mollissimis aculeata *ibid. t. 39.* ‡
 — villosa minor, pinnul. profunde &c. *ibid. t. 43.*
 — non ramosa in obtusas pinnulas &c. *ibid. t. 45.* §
 — minor in pinna tantum divisa &c. *Sloane H. 1. t. 44.*
 — ramosa maxima scandens *ibid. t. 60.*
 — pumila palustris Virginiana *Phuk. Alm. t. 284. f. 1.*
 (forte *P. Thelypteris L.*)
 — Virginiana non ramosa *ibid. f. 2.*
 — saxatilis pervenusta &c. *ibid. f. 4.*
 — non ramosa Jamaicensis *ibid. t. 286. f. 1.*
 — polypodioides dicta major Virginiana *ibid. t. 287. f. 1.*
 — Mas Jamaicensis ramosa *ibid. t. 296. f. 1.*
 — ramosa Jamaicensis Apii foliis *ibid. f. 2.*
 — Filicula s. Bryopt. repens Sinarum *ibid. t. 400. f. 3.*
 — Phyllitis dicta minima cheusanensis *ibid. t. 405. f. 4.*
Amna panna Rhede Hort. Mal. xii. t. 31.
Dryopteris triplex Rumpf. Amb. 6. t. 32. f. 1.
Pteris interrupta Willd. Phyt. 1. t. (affine *Asp. pteridii*
 et parasitico.)

Acrostichum ferruginosum Linn. (forte var. *Polyp. incani.*)

† Est *Polypod. decussatum L.* ejusque varietas.—Ed.

‡ Est *Polyp. muricatum L.* sed nomen specif. minus aptum.—Ed.

§ Fig. 1. tab. xlv. minus notæ *Polypodii* species esse videtur; fig. 2. est *Blackium occidentale*.—Ed.

7. ASPLENIUM LINN.

CHAR. *Capsulæ* in lineolas rectas sparsas dispositæ.—*Indusia* e venis lateraliter orta costam versus dehiscencia.

* *fronde indivisa.*

1. *A. lanceum*, fronde elliptica glabra, stipite tereti squamoso. *Thunb. Fl. Jap.*—*Ic. Jap. Dec.* 2.
2. *A. rhizophyllum*, fronde cordato-ensiformi, apice filiformi radicante. *Linn.*—*Pluk. Alm. t.* 105. *f.* 3.
3. *A. proliferum*, fronde sessili lato-lanceolato, apice attenuato-radicante. *Fl. I. Occ.*—*Sloane H. 1. t.* 26. *f.* 1.
4. *A. Nidus*, fronde lanceolata integerrima glabra sessili. *Linn.*—*Breyn. Cent. t.* 99.
5. *A. serratum*, fronde lanceolata serrata sessili. *L.*—*Plum. Fil. t.* 124.
6. *A. bifolium*, frondibus binatis, foliolis basi connatis lanceolatis subsinuatis. *Linn.*—*Plum. Fil. t.* 133.—An species *Scolopendrii*?

** *fronde divisa.*

7. *A. septentrionale*, stipitibus nudis glabris superne bipartitis, foliolis linearibus apice laciniatis.*—*Acrost. septentrionale L.*—*Flor. Dan. t.* 60.
8. *A. australe*, stipitibus nudis glabris superne dichotomis, foliolis subulatis curvato-secundis.—*Acrost. australe Linn. Suppl.*
9. *A. radiatum*, stipitibus nudis glabris superne radiato-dichotomis, laciniis linearibus acutis rectis.—*Acrost. radiatum Koenig.*—*A. australe Vahl. Symb. 1. t.* 25.
10. *A. Hemionitis*, frondibus cordato-hastatis quinquelobis. *L.*—*Clus. Hist. p.* ccxiv.

*** *fronde pinnatifida.*

11. *A. Ceterach*, frondibus pinnatifidis, laciniis alternis confluentibus obtusis subtus squamosis. *L.*—*Plum. Fil. t. B.*

t. B. f. 3.—*Scolopendrium Ceterach* Sm. *Brit.—Engl. Bot.* 1244.

12. *A. obtusifolium*, frondibus subpinnatis, pinnis alternis obtusis sinuatis decurrentibus. L.—*Plum. Fil.* t. 67.

**** *fronde pinnata*.

13. *A. pumilum*, frondibus ternatis pinnatisve, foliolis tripartitis lobatis. *Fl. Ind. Occ.*—*Asplen. anthriscifolium* Jacq. *Coll.* 2. t. 2. f. 3, 4.—*Plum. Fil.* t. 66. A.

14. *A. marginatum*, frondibus pinnatis, pinnis oppositis ovato-lanceolatis submarginatis. L. (3n hujus generis s. *Displazii*?† vid. infra)—*Plum. Fil.* t. 106.

15. **A. decussatum*, pinnis subcordatis lato-lanceolatis serratis basi utrinque obtuse auritis.*

16. *A. salicifolium*, pinnis subtrapezio-lanceolatis falcatis inæqualiter crenatis basi sursum obtuse rectangulis. L.—*Plum. Fil.* t. 60.

17. *A. cultrifolium*, pinnis falcato-lanceolatis inciso-serratis basi deorsum angulatis, inferioribus sursum auritis. Linn.—*Plum. Fil.* t. 59.

18. **A. lineatum*, pinnis lato-lanceolatis acuminatis serratis lineatis basi sursum rectangulis, lineis fructif. decussato-parallelis.*

19. *A. erosum*, pinnis trapezio-lanceolatis subfalcatis crenato-serrulatis basi sursum auritis. Linn.

20. *A. dimidiatum*, pinnis dimidiatis trapezio-oblongis acuminatis laciniato-serratis. *Fl. Ind. Occ.*

21. *A. polyodon*, pinnis trapezoides acuminatis, duplicato-dentatis. Forst.*

22. **A. macrophyllum*, pinnis trapeziis acuminatis inciso-serratis petiolatis, lineis fructif. radicato-parallelis longissimis.*

23. *A. auritum*, pinnis lanceolatis inciso-serratis basi sursum auritis. *Fl. Ind. Occ.*—*Sloane H.* 1. t. 33. f. 2.

† Est distincta *Asplenii* species, indusii apicem versus hiantibus.—Ed.

24. **A. compressum*, pinnis oblongo-lanceolatis acuminatis serratis basi sursum lobo conniventibus deorsum decurrentibus, rachi marginata stipiteque compresso.*
25. *A. falcatum*, pinnis subtrapezio-lanceolatis falcatis apice attenuatis inciso-serratis. *Retz. Obs. 6.*—*Lamarck Encycl.*—*Trichom. adiantoides L.*—*Burm. Zeyl. t. 43.*
26. *A. tenerum*, pinnis rhombeo-oblongis obtusis inciso-serratis. *Forst.**
27. *A. lunulatum*, pinnis rhombeo-ovatis falcatis obtusis crenulatis.—*A. falcatum Thunb. Prodr. Cap.*
28. *A. obtusatum*, pinnis oblongis obtusis serratis basi oblique truncatis, lineis fructiferis parallelis. *Forst.*
29. *A. obliquum*, pinnis trapezio-oblongis acuminatis obtuse serratis, stipite squamuloso. *Forst.**
30. *A. lucidum*, pinnis elliptico-acuminatis serratis, lineis fructiferis decussato-parallelis. *Forst.**
31. *A. ebenum*, pinnis lanceolatis subfalcatis serratis basi auritis, stipite lævissimo. *Hort. Kew. 462.*—*Acrost. platyneuron Linn. ? †*
32. *A. marinum*, pinnis trapezio-ovatis obtusis serratis basi sursum lobatis. *L.—Engl. Bot. 392.*
33. **A. polypodioides*, pinnis oblongis subserratis basi utrinque obtuse auritis, inferioribus brevioribus.* *Pluk. Ph. 287. f. 2.*—*Moris. H. 14. t. 2. f. 12.*
34. *A. dentatum*, pinnis rhombeo-ovatis obtusis crenatis dentatisve. *L.—Plum. Fil. t. 101.*
25. *A. viride*, pinnis rhombeo-subrotundis serratis. *Bolton t. 14.*
36. *A. monanthemum*, pinnis trapeziformibus obtusis superne crenatis, linea fructifera unica. *L.—Smith ined. t. 73.*—*Houtt. H. ii. t. 97. f. 2.*
37. *A. resectum*, pinnis trapeziformibus acuminatis inciso-crenatis postice integris. *Smith ined. t. 72.*

† Itz; exclusis synonymis Plukenetii et Morisoni.—Ed.

38. *A. trichomanoides*, pinnis subrotundis crenulatis. *L.*—*Fl. Dan. t. 119.*—*Engl. Bot. 576.*

39. *A. incisum*, pinnis subrotundis incisiss acute dentatis.—*A. trichomanes Thunb. Act. Soc. Linn.*—*Fl. Jap.*

***** *fronde bipinnatifida et bipinnata.*

40. **A. ambiguum*, frondibus bipinnatis superne pinnatis, pinnulis oblongo-lanceolatis basi utrinque auritis serratis, lineis fructiferis ad venas transversales utrinque decussantibus.*

41. **A. Acrostichoides*, frondibus bipinnatifidis, pinnis ensiformibus, laciniis ovatis acutis subserratis, lineis fructiferis transversis confertis.*

42. *A. cordatum*, frondibus pinnatis bipinnatifidisque subtus paleaceis, pinnis cordatis, laciniis rotundatis crenatis.*
—*Acrost. cordatum Thunb. Prodr. Cap.*

43. *A. striatum*, frondibus bipinnatifidis, pinnis lanceolatis, laciniis oblongis obtusis serratis, terminali acuminata.
L.—*Plum. Fil. t. 18, 19.*

44. **A. costale*, frondibus bipinnatifidis, pinnis lanceolatis, laciniis lanceolato-falcatis acutis serrulatis, lineolis fructiferis costa utrinque contiguis.*

45. *A. japonicum*, pinnis inciso-pinnatifidis, laciniis acutis serrulatis, stipite squamoso. *Thunb. Jap.*

46. *A. dissectum*, pinnis lanceolatis apice attenuato-linearibus subpinnatifidis, laciniis bidentatis, stipite lævi.
Fl. Ind. Occ.

47. *A. caudatum*, pinnis pinnatifidis lineari-lanceolatis apice attenuato-setaceis, laciniis inciso-serratis, stipite hirsuto. *Forst.**

48. *A. præmorsum*, pinnis pinnatifidis cuneato-oblongis, laciniis apice crosso-dentatis, rachis hirsuta. *Flor. Ind. Occ.*

49. *A. furcatum*, pinnis subpinnatis, pinnulis cuneatis apice trifidis, laciniis acutis dentatisve. *Thunb. Prodr.*—*Aspl. falsum Retz. Obs. 6. 32.*—*A. adiantoides Lam.*

50. *A. lanceo-*

50. *A. lanceolatum*, pinnis pinnatis ovato-lanceolatis, pinnulis obovatis argute dentatis. *Engl. Bot. t. 240.*
51. *A. squamosum*, pinnis pinnatis, pinnulis ovatis acuminatis sinuatis, stipite rachive squamosis. *L.—Plum. Fil. t. 103.*
52. *A. bulbiferum*, pinnis pinnatis marginatis, pinnulis decurrentibus oblongis inciso-serratis superne proliferis. *Forst.**
53. *A. rhizophorum*, pinnis pinnatis, pinnulis rhomboideo-ovatis obtusis dentatis, baseos subauritis, frondibus apice remote pinnatis radicanibus. *Lin.*
54. **A. affine*, pinnis pinnatis, pinnulis rhomboideo-ovatis subacutis serrato-dentatis, inferioribus basi auritis, fronde apice attenuata.*
55. *A. cuneatum*, pinnis pinnatis, infimis oppositis, pinnulis cuneatis apice obtusis rotundatis inciso-crenatis. *Lam.—Sloan. H. 1. t. 46. f. 2.*
- X 56. *A. Adiantum nigrum*, frondibus subtripinnatis pinnulis ovato-lanceolatis inciso-serratis. *L.—Fl. Dan. t. 250.*
57. *A. fragrans*, frondibus subtripinnatis, pinnulis lanceolatis apice serratis. *Fl. Ind. Occ.*
58. *A. Ruta muraria*, frondibus alternatim decompositis, pinnulis cuneato-rhomboideis subtrilobatis crenulatis. *L.—Flor. Dan. 190.—Gleichen Neuestes etc. t. 24. f. 3.*
59. *A. Breynii*, frond. alternatim subdecompositis, pinnulis cuneiformibus apice incis. *Retz.—A. alternifolium Jacq. Misc. 2. t. 5. f. 2.—A. germanicum Weiss.—Breyn. Cent. 1. t. 97.*
60. *A. cuspidatum*, frondibus elongatis alternatim decompositis, pinnulis lanceolatis cuspidatis subintegris, stipite glabro filiformi. *Lam.*

Inquirenda.

Asplenium daucifolium *Lamarck Encycl.*

————— *juglandifolium* *ibid.* } (forte *Diplazium grandifolium*.)
 ————— *laserpitiifolium* *ibid.* }

Asplenium

- Asplenium palmatum* *ibid.* } (forte var. *A. Hemionitidis*.)
 ————— *pellucidum* *ibid.* }
 ————— *proliferum* }
 ————— *sulcatum* } forte ab *Asplenio* diversa.
 ————— *tomentosum* }
 ————— *Hemionitis Lour. Cochinch.*
 ————— *nodosum* *ibid.*
 ————— *Trichomanoides* *ibid.*
 ————— *bulbosum* *ibid.*
 ————— *lanceolatum Forsk. Æg. arab.*
 ————— *arifolium Burm. Ind.*
 ————— *arborescens supradecompositum Brown Jam. 95.*
 ————— *crispum subrotund. &c. Barrel. ic. 603.*
 ————— *majus, oblongis serratis &c. ibid. ic. 604.*
Polypodium majus cordubense ibid. ic. 1111.
Filix Adianti nigri facie minor Plum. Fil. t. 41.
Lonchitis latifolia ped. lucidis ibid. t. 59.
 ————— *auric. subrotundis laciniata.—A. pellucidum Lamarck.—Plum. Fil. t. 61.*
 ————— *foliis superius incisis major Plum. Fil. t. 65.*
 ————— *foliis superius incisis ibid. t. 66. B.*
Trichomanes crenulis bifidis incisum ibid. t. 74.
Lingua cervina ramosa ibid. t. 103.†
Adiantum nigrum ramosum minus Sloane H. 1. t. 54. f. 1.
Filicifolia phyllitis caulifera Pluk. Alm. t. 405. f. 2.
Hemionitis Luzonis ima Kam. Petiv. Gaz. t. 20. f. 3.
Para-panna Maravara Rheede Mab. xii. t. 15.
Kal ————— ibid. t. 16.
? Nella ————— ibid. t. 18.

8. CÆNOPTERIS BERGII.

Darea Juss. Smith.

CHAR. *Capsulæ* in lineolas submarginales ordinatæ.—
Indusia e venis lateraliter orta, exterius dehiscentia.

† Est *Asplen. squamosum* ; vid. supra n. 51.—ED.

1. *C. flaccida*, fronde pinnata, pinnis elliptico-lanceolatis incisib serratis.* *Thunb.*—*Asplenium flaccidum* *Forst.*—*Act. Nov. Petrop. ix.* 159. *t. D. f.* 1, 2.
2. *C. auriculata*, fronde pinnata ensiformi, pinnis oblongis obtusis incisib, laciniis linearibus, infimis bifido-auriculatis. *Thunb. Prodr. Cap.*—*Act. Nov. Petro. ix.* *t. E. f.* 2.
3. *C. Odontites*, fronde bipinnatifida, pinnulis lanceolatis acutis, inferioribus fissis. *Thunb. Prodr. Cap.*—*Act. Nov. Petrop. ix. t. E. f.* 1.
4. *C. rhizophylla*, fronde bipinnata, pinnulis distinctis obovatis subfalcatis, primordialibus deltoideis lobatis. *Smith.*—*Flor. Ind. Occ.*—*Smith ined. t.* 50.
5. *C. furcata*, fronde 3-pinnatifida apice bipinnatifida, pinnulis lanceolatis obtusis sparse bipartitis. *Thunb. Prodr.*—*Adiantum furcatum* *Linn. Suppl. (exclus. synonym. Pluk.)*—*Cænopt. rutæfolia* *Berg. Act. Petr. vi. t.* 7. *f.* 1, 2.—*C. furcata*, ejusdem specimen imperfectum.—*Asplen. Borbonicum* *Jacq. Coll. 3. t.* 21. *f.* 1.—*Lonchitis bipinnata* *Forsk.*—*Act. Petr. ix. t. F. f.* 1.
6. *C. cicutaria*, fronde subtripinnata, pinnulis ovatis, laciniis lanceolatis coadunatis, primordialibus cuneatis incisib. *Flor. Ind. Occ.*—*Asplenium cicutarium* *Sw. Prodr.*—*A. cristatum* *Lam.*—*Act. Petrop. ix.* 160. *t. G. f.* 1. *t. F. f.* 2.
7. *C. myriophylla*, fronde tripinnata pinnulis obovatis, primordialibus obcordatis lobatisque. *Flor. Ind. Occ.*
8. *C. vivipara*, fronde tripinnata, pinnulis filiformibus. *Berg.*—*Asplenium viviparum* *Linn. Suppl.*—*Act. Nov. Petr. vi. p.* 11. *t.* 7. *f.* 3.
9. *C. japonica*, fronde tripinnata apice pinnata, pinnulis lanceolatis acutis incisib integrisve. *Thunb.*—*Trichomanes japonicum* *Thunb. Fl. Jap.*—*Act. Nov. Petr. ix.* *p.* 161. *t. G. f.* 2.

Inquirendæ.

Cænopteris Novæ Zelandiæ Sprengel in Schrad. Journ. d.
Bot. 1799. 2. p. 269.

Adiantum achilleæfolium Lam. (forte *C. furcata*.)

9. SCOLOPENDRIUM SMITH.

CHAR. *Capsulæ* in lineolis sparsis interveniis.—*Indusia* superficialia, sibi invicem longitudinaliter incumbentia, sutura longitudinali dehiscentia.

SCOLOPENDR. *officinarum*.—Asplen. scolopendrium Linn.
—Plum. Fil. t. A. f. 4.

Inquirenda.

Asplenium scolopendrium Loureiro Cochinch.

———— *bifolium* Linn.—Plum. Fil. t. 133.

10. DIPLAZIUM.

CHAR. *Capsulæ* in lineolis sparsis, decussantibus, geminis, venæ frondis approximatis.—*Indusia* geminata e vena orta, utrinque exterius dehiscentia. (Nomen a *Διπλᾶζω*, geminus sum.)

1. *D. plantagineum*, frondibus ovato-lanceolatis serrato-crenatis stipite tetragono.—Asplen. plantagineum Linn.
—Hemionitis plantaginea Smith.
 2. *D. grandifolium*, frondibus pinnatis, pinnis lato-lanceolatis subserratis basi angulatis.—Asplen. grandifolium Sw. Prodr.—Hemionitis grandifolia Smith.
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11. LONCHITIS LINN.

CHAR. *Capsulæ* in lineolas lunulatas sinibus frondis subjectas distributæ.—*Indusia* e margine ipsius frondis inflexo, interius dehiscentia.

1. *L. hirsuta*,

1. *L. hirsuta*, frondibus pinnatifidis obtusis integerrimis, surculis ramosis hirsutis. *Linn.—Plum. Fil. t. 20.*
2. *L. repens*, frondibus pinnatis, pinnis alternis sinuatis, surculis ramosis aculeatis. *Linn.—Plum. Fil. t. 12.*
3. *L. aurita*, frondibus pinnatis, pinnis infimis bipartitis, surculis indivisis aculeatis. *Linn.—Plum. Fil. t. 17.*
4. *L. tenuifolia*, frondibus supra decompositis, pinnulis lineari-oblongis serratis, infimis pinnatifidis. *Forst.**

Dubia.

Lonchitis javanica *Lam. Encyc.*

12. PTERIS LINN.

CHAR. *Capsulæ* in lineam continuam, rarius interruptam, ad marginem frondis subtus digestæ.—*Indusium* e margine ipsius frondis membranaceo inflexo continuo, *interius* dehiscente.

a. Pteroides propria.

* *fronde simplici.*

1. *P. piloselloides*, frondibus sterilibus obovatis,^t fertilibus lanceolatis longioribus e surculo reptante. *Linn.—Kæmpf. ic. Banks. t. 31.*
2. *P. angustifolia*, frondibus lanceolato-linearibus integris erectis margine toto fructificantibus. *Flor. Ind. Occ.*
3. *P. lanceolata*, frondibus lanceolatis subangulatis apice fructificantibus. *Linn.—Plum. Fil. t. 132.*
4. *P. tricuspidata*, frondibus linearibus apice trifidis. *Linn.—Plum. Fil. t. 140.*
5. *P. furcata*, frondibus dichotomis subtus hispidis apice fructificantibus. *Linn.—Plum. Fil. t. 141.*

** *fronde pinnata.*

6. *P. grandifolia*, pinnis oppositis ovato-linearibus acuminatis integris. *Linn.—Plum. Fil. t. 105.*

7. *P. longifolia*, pinnis linearibus repandis basi cordatis. *Linn.—Plum. Fil. t. 69.*
8. *P. vittata*, pinnis linearibus rectis basi rotundatis. *Linn.*
—*P. obliqua Forsk.—Osbeck It. Chin. t. 4.*
9. *P. stipularis*, pinnis linearibus sessilibus stipulis lanceolatis. *Linn.—Plum. Fil. t. 70.*
10. *P. cretica*, pinnis oppositis lanceolatis serrulatis basi angustatis, infimis tripartitis. *Linn.—P. semiserrata Forsk.—Tournef. Inst. 3. t. 321.—(P. Stelleri Nov. Com. Petrop. xii. t. 12. 1. hujus variet. videtur.)*
11. *P. serraria*, pinnis oppositis lineari-lanceolatis apice denticulato-serrulatis, infimis binatis. *Thunb: Prodr. Cap.*
12. *P. crenata*, pinnis linearibus apice serrulatis, inferioribus subpinnatis, pinnulis obtusis.*—*P. ensiformis Houytt.—Burm. Zeyl. t. 87.—β. Filicula cheusanica Pluk. Alm. t. 407. f. 2.*

*** *fronde bipinnatifida et bipinnata.*

13. *P. thalictroides*, pinnis sterilibus pinnatifidis, laciniis obtusis, fructiferis pinnatis, pinnulis bipartitis linearibus.*
—*Acrost. thalictroides Linn. Fl. Zeyl. t. 4.—Acrost. siliquosum Linn. Sp.—Rumpf Amb. vi. t. 74. f. 1. (frondes fertiles.)*
- ✱ 14. *P. denticulata*, frondibus pinnatis, pinnis inferioribus semipinnatis lanceolatis, sterilibus denticulato-spinulosis, fertilibus integris. *Flor. Ind. Occ.*
15. **P. attenuata*, pinnis ensiformibus sinuato-pinnatifidis, laciniis lanceolatis subfalcatis, terminali elongata.*
16. *P. arguta*, frondibus subbipinnatis, pinnis infimis bis bipartitis, laciniis lanceolatis serratis. *Vahl. Symb. 1.—Ait. Hort. Kew.—Pluk. Alm. t. 290. f. 2.*
17. *P. comans*, frondibus bipinnatifidis, laciniis elongato-lanceolatis apice attenuatis serratis.
18. *P. incisa*, frondibus bipinnatis, pinnulis adnatis subintegris, inferioribus inciso-dentatis. *Thunb. Prodr.*
19. *P. liaurita*,

19. *P. biaurita*, frondibus bipinnatifidis, pinnis infimis bipartitis. *Linn.—Plum. Fil. t. 15.*

20. *P. semipinnata*, frondibus subbipinnatis, pinnis laciniisque baseos pinnatifidis semipinnatifidisque. *Linn.—Osbeck It. Chin. t. 3. f. 1.—Houtt N. H. t. 96. f. 2.*

21. *P. flabellata*, frondibus bipinnatifidis, pinnis infimis semibipinnatifidis, laciniis decurrentibus lanceolato-linearibus serratis. *Thunb. Prodr. Cap.*

22. *P. mutilata*, frondibus decompositis, pinnis infimis semipinnatifidis, terminalibus baseosque longissimis.—*L.—Plum. Fil. t. 51.*

**** *fronde supradecomposita.*

23. **P. tripartita*, fronde tripartita, foliolis bipinnatifidis, lateralibus bipartitis.*

24. *P. podophylla*, fronde pedata, foliolis bipinnatifidis, lateralibus tripartitis.—*Lonch. pedata L.—Brown Jam. t. 1.*

25. **P. Adscensionis*, foliolis subbipinnatis, pinnis decurrentibus ovato-lanceolatis obtusiusculis dentato-serratis, infimis pinnatifidis.*

26. **P. villosa*, foliolis bipinnatifidis, pinnis lato-lanceolatis, pinnulis decurrentibus ovato-lanceolatis sinuato-incisis, laciniis ovatis.*

27. *P. aculeata*, foliolis bipinnatifidis, pinnis lato-lanceolatis, laciniis serratis, terminali elongata, caudice arboreo ramisque aculeatis. *Flor. Ind. Occ.—P. arborea Linn.?*
—*Plum. Fil. t. 5. frons fructif. t. 9. fr. sterilis.*

28. *P. aquilina*, foliolis pinnatis, pinnis lanceolatis repandis, infimis pinnatifidis, superioribus minoribus. *Linn.—Blackw. t. 325.*

29. *P. caudata*, foliolis bipinnatis, pinnulis sublinearibus, infimis basi pinnatifidis, terminalibus longioribus. *L.—Plum. Fil. t. 29.*

30. *P. esculenta*, foliolis bipinnatis, pinnulis linearibus decurrenti-coadunatis, summis brevioribus. *Forst.**

31. *P. capensis*, foliolis bipinnatis subtus hirsutis, pinnulis linearibus coadunatis, terminalibus longioribus. *Thunb. Prodr. Cap.*
32. *P. heterophylla*, foliolis bipinnatis, pinnulis cuneato-oblongis, sterilium serratis, fertilium angulatis apice dentatis. *L.—Adiantum hexagonum L.—Plum. Fil. t. 37.*
- × 33. *P. crispa*, foliolis bipinnatis, pinnulis sterilibus subrotundis incis, fertil. oblongo-linearibus integris.—*Os-munda crispa L.*—Fl. Dan. 496.—Engl. Bot. 1160.*

β. *Adiantoideæ* (fructificatio *Pteridis*, stipes fuscus *Adianti*).

34. *P. rotundifolia*, frondibus pinnatis hispidis, pinnis subrotundis obsolete crenatis. *Forst.**
35. *P. trichomanoides*, frondibus pinnatis, pinnis subovatis repandis subtus hirtis. *L.—Plum. Fil. t. 75.*
36. *P. varia*, frondibus pinnatis, pinnis inferioribus subrotundis, superioribus ovatis, basi utrinque subauritis.*
37. *P. auriculata*, frondibus pinnatis, pinnis ovatis sursum auritis integris subpinnatifidisque, fructiferis acutis crenulatis.—*Adiant. auriculatum Thunb. Prodr. Cap.*
38. *P. pedata*, frondibus quinquangulis trifoliatis glaberrimis, foliolis pinnatifidis, lateralibus bipartitis. *Linn.—Plum. Fil. t. 152.*
39. *P. argentea*, frondibus quinquangulis trifoliatis subtus candido-pulverulentis, foliolis pinnatifidis, lateralibus bipartitis.* *Gmel. in Nov. Comm. Petrop. xii. t. 12. f. 2.*
40. **P. involuta*, frondibus bipinnatis, pinnulis subcordato-ovatis adnatis, indusio plicato, stipite paleaceo hirto.*
41. *P. farinosa*, fronde inferne tripinnatifida superne bipinnatifida, laciniis ovatis obtusis subtus farinoso-niveis. *Forsk.—Vahl. Symb. 3. t. 75.*
42. *P. atropurpurea*, frondibus decompositis, pinnis lanceolatis, terminalibus longioribus. *Linn.—Pluk. Phyt. t. 431. f. 3.*

43. *P. hastata.*

43. *P. hastata*, frondibus supradecompositis, foliolis remotis bipinnatifidis, pinnis ovato-lanceolatis subhastatis crenulatis, inferioribus trilobis, indusio plicato.*—*Adiantum hastatum* L. Sup.—*Pteris auriculata* Thunb. Prodr.

44. *P. calomelanos*, frondibus supradecompositis, foliolis bipinnatis, pinnulis cordatis integris obtuse triangulis, majoribus subhastatis (trilobis), stipite glaberrimo.—*Pteris hastata* Thunb. Prodr.

Inquirendæ.

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| <i>Pteris cuspidata</i> | } <i>Thunb. Prodr. Cap.</i> | } fructificatio ignota. |
| — <i>tabularis</i> | | |
| — <i>confluens</i> | | |
| — <i>nervosa</i> | } <i>Thunb. Flor. Jap.</i> | |
| — <i>sinuata</i> | | |
| — <i>subciliata</i> | | |
| — <i>dentata</i> | } <i>Forsk. Flora Ægypt. Arab.</i> | |
| — <i>4-pinnata</i> | | |
| — <i>regularis</i> | | |
| — <i>decursiva</i> | | |
| — <i>serrata</i> | | |
| — <i>lanceolata</i> | } <i>Loureiro Flora Cochinch.</i> | |
| — <i>vittata</i> | | |
| — <i>caudata</i> | | |
| — <i>mauritiana</i> | <i>Willem. Usteri Ann. xii. 61.</i> | |
| — <i>adiantoides</i> | <i>Burm. Cap. Prod.</i> | |
| — <i>ensiformis</i> | <i>Burm. Fl. Ind.</i> | |
| — <i>thalictroides</i> | <i>Mühlenb. Act. Amer. vol. iii.</i> | |
| — <i>quadriaurita</i> | <i>Retz, Obs. vi. (forte P. argutæ synonym.)</i> | |
| — <i>nigra</i> | <i>Retz. Obs. vi.</i> | |
| <i>Filix latifolia caudata</i> | <i>pinn. Lonchit. Plum. Fil. t. 13.</i> | |
| — <i>alia caudata et spinosa</i> | <i>ibid. t. 14.</i> | |
| — <i>crenis rotundis et nigricante limbo</i> | <i>ibid. t. 42.</i> | |
| — <i>non ramosa maxima</i> | <i>Sloane H. 1. t. 47.</i> | |
| — <i>major caudice carens.</i> | <i>Petiv. Gaz. t. 63. 9.</i> | |
| — <i>Luzone steeple-fern</i> | <i>Petiv. Gaz. t. 80. 3.</i> | |

13. VITTARIA SMITH.

CHAR. *Capsulæ* in lineis longitudinalibus, continuis, per discum s. prope marginem frondis dispositæ.—*Indusium* duplex, continuum, alterum exterius aliud interius dehiscens.

1. *V. lineata*, frondibus linearibus longissimis pendulis, lineis fructificantibus solitariis.—*Pteris lineata* Linn.—*Plum. Fil. t. 143*.
2. *V. lanceolata*, frond. lanceolato-linearibus erectis, lineis fructificantibus pluribus. *Fl. Ind. Occ.*—*Hemionitis lineata* Prodr.—*Act. n. S. Scrut. Nat. Berol. ii. t. 7*.
3. *V. ensiformis*, frondibus lineari-ensiformibus erectis, lineis fructiferis solitariis marginalibus. *Act. n. S. Scr. Nat. Berol. ii. t. 7. f. 1.*

Dubia.

Pteris Blechnoides Willd. *Phyt. 1. 13. t. 9. f. 2.*

14. ONOCLEA LINN.

CHAR. *Capsulæ* confertæ, dorsum totum pinnarum frondis diversæ occupantes.—*Indusium* e margine membranaceo frondis revoluta, plerumque lacerum, interius dehiscens.

1. *O. sensibilis*, frondibus sterilibus pinnatis, pinnis incisis, superioribus coadunatis, fructificantibus bipinnatis, pinnulis recurvato-globosis.* *L.*—*Pluk. Phyt. 404. f. 2*.
2. *O. Struthiopteris*, frondibus bipinnatifidis, fructificantibus pinnis linearibus obtusis, pinnulis subrotundis.*—*Osmunda Struthiopteris* L.—*Flora Dan. t. 169*.
3. *O. capensis*, frondibus pinnatis, sterilibus pinnis cordato-lanceolatis serrulatis, fructificantibus linearibus nudis.—*Osmunda capensis* Linn.
4. *O. lineata*, frondibus pinnatis, sterilibus pinnis oblique cordatis

cordatis subintegris, fructificantibus linearibus, costa paleacea. *Fl. Ind. Occ.*—*Osmunda lineata Prodr.*

5. **O. attenuata*, frondibus sterilibus pinnatifidis, lacinia terminali longissima, fructificantibus pinnatis linearibus.*

Inquirendæ.

Osmunda pollicina Willem. in Ust. Ann. xii. 81.

Polypod. rigidis et acuminatis pinnulis Plum. Fil. t. 90.

———— *fuscum &c. Plum. Fil. t. 81.*

Lonchitis virginiana Moxis. Ox. 569. 14. 2. 24.

———— *volubilis Rumpf Amb. vi. t. 31.*

Acrostichum sorbifolium Linn. ?

15. BLECHNUM LINN.

CHAR. *Capsulæ* in lineam longitudinalem, continuam, ad latera costæ frondis (in quibusdam diversæ) utrinque, illæque parallelam, dispositæ.—*Indusium* superficialium (intra margines) continuum, interius dehiscens.

- * 1. *B. occidentale*, frondibus pinnatis, pinnis oppositis lanceolatis basi emarginatis, superioribus coadunatis. *L.*—*Plum. Fil. t. 62.*
- 2. *B. australe*, frondibus pinnatis, pinnis cordato-lanceolatis mucronatis margine scabris. *L.*—*Pluk. Alm. t. 89. f. 7.*
- 3. *B. orientale*, frondibus pinnatis, pinnis ensiformibus attenuatis alternis. *L.*—*Filix malaccensis Petiv. Mus. n. 543.*
- 4. *B. punctulatum*, frondibus pinnatis, pinnis cordato-linearilanceolatis subfalcatis margine punctatis, inferioribus sensim abbreviatis.*
- 5. **B. rigidum*, frondibus pinnatis, pinnis cordato-lanceolatis obtusis, summis confluentibus.*
- 6. *B. boreale*, frondibus sterilibus pinnatifidis, laciniis lanceolatis obtusiusculis parallelis, fructif. pinnatis, pinnis linearibus

linearibus acuminatis. *Smith*.—*Osmunda spicant* *L.*—*Acrostichum*, *Onoclea*, *Asplenium*, *Struthiopteris Aliorum*—*Fl. Dan.* 69.—*Engl. Bot.* 1159.

7. *B. Onocleoides*, frondib. steril. pinnatifidis, laciniis lanceolatis falcatis acuminatis, fructific. pinnatis linearibus remotiusculis. *Fl. I. Occ.*—*Osm. polypodioides Prodr.*
8. *B. procerum*, frondibus pinnatis distinctis, steril. pinnis remotis ovato-oblongis acuminatis serratis, fructif. linearibus.*—*Osmunda procera Forst.*

Inquirenda.

Blechnum serrulatum Richard Act. Soc. H. N. Paris.

———— capense *Burm. Prodr. Cap.*

———— indicum ——— *Fl. Ind.*

Filix non ramosa fem. pinnulis nervo medio pulverulento
Pluk. Mant. t. 406. f. 4.

16. WOODWARDIA SMITH.

CHAR. *Capsulæ* in puncta oblonga, distincta, costæ frondis adjacentia, dispositæ.—*Indusia* superficialia, fornicata, costam versus dehiscencia.

1. *W. angustifolia*, fronde pinnata, pinnis linearibus acutis integerrimis. *Smith*.—*Acrostichum areolatum L.*
2. *W. japonica*, fronde pinnata, pinnis pinnatifidis, nervo nudo, lobis obtusis serratis, stipite squamoso.—*Blechnum japon.* *Thunb. Fl. Jap. t. 35.*
3. **W. orientalis*, fronde pinnata, pinnis pinnatifidis, nervo nudo, lobis ovato-lanceolatis integris, stipite glabro.*—*Blechnum radicans* var. *Houtt. N. H. ii. t. 97. f. 1.*
4. *W. radicans*, fronde pinnata, pinnis pinnatifidis, nervo nudo, lobis acutis serratis, stipite glabro.—*Blechnum radicans L.*—*Till. Pis. 62. t. 24.*
5. *W. virginica*,

3. *W. virginica*, fronde pinnata, pinnis pinnatifidis, nervo utrinque fructificante, lobis obtusis serrulatis, stipite glabro.—*Blechnum virginicum* Linn.—*Pluk. Phyt. t. 179. f. 2.*
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Inquirendæ.

Blechnum carolinianum Walt. Car. p. 257,

Filix floridana, perlongis et angustis pinnulis *Pluk. Phyt. t. 396.*

17. LINDSÆA DRYAND.

CHAR. *Capsulæ* in lineam continuam a margine parum remotam, ordinatæ.—*Indusium* superficialium, continuum, exterius dehiscens.

1. *L. sagittata*, fronde simplici sagittata cordatave acuminata. *Dryand. Act. Soc. Linn. iii. 40.*—*Aubl. Guian. t. 336.*—*Adiantum sagittatum.*
- > 2. *L. reniformis*, fronde simplici reniformi obtusa. *Dryand. Act. Soc. Linn. iii. t. 7. f. 1.*
3. **L. ensifolia*, fronde pinnata, pinnis ensiformibus alternis.*
4. **L. linearis*, fronde pinnata lineari, pinuis brevissimis triangularibus antice crenulatis fructiferis.*
5. *L. falcata*, fronde pinnata, pinnis deorsum falcatis integerrimis. *Dryand. Act. Soc. Linn. iii. t. 7. f. 2.*
6. *L. heterophylla*, fronde pinnata, pinuis integris serrulatisve, inferioribus rhombo-lanceolatis acuminatis, superioribus rhombeis obtusis, extimis confluentibus. *Dryand. Act. S. Linn. iii. t. 8. f. 2.*
7. *L. flabellulata*, fronde pinnata, pinnis flabelliformibus denticulatis, adultiorum inferiorum pinnatifidis. *Dryand. Act. S. Linn. iii. t. 8. f. 2.*—*Adiant. orbiculatum* Lam.
8. *L. trapeziformis*, fronde bipinnata, pinnis patentibus lanceolatis, pinnulis trapeziformibus, infimis flabelliformibus. *Dryand.*
9. *L. guianensis*,

9. *L. guianensis*, fronde bipinnata, pinnis patentibus subulatis, pinnulis inferioribus lunatis, mediis trapeziformibus, supremis flabelliformibus. *Dryand.*—*Adiantum guianense Aubl. Guian. t. 365.*
10. *L. stricta*, fronde bipinnata, pinnis erectis strictis, pinnulis trapeziformibus. *Dryand.*—*Flor. Ind. Occ.*—*Adiantum strictum Sw. Prodr.*
11. *L. trichomanoides*, fronde bipinnata, pinnulis cuneatis sublinearibus retusis. *Dryand. Act. S. Linn. iii. t. 11.*—*Adiantum cuneatum Forst. Prodr.*
12. *L. tenera*, fronde triangulari-tripinnatifida, laciniis obovato-rhombeis incisis. *Dryand. Act. S. Linn. iii. t. 10.*
13. **L. microphylla*, fronde tripinnatifida lanceolata, laciniis cuneatis apice dilatatis crenulatis.*

18. ADIANTUM LINN.

CHAR. *Capsulæ* in puncta discreta s: lineolas ad marginem frondis distributæ.—*Indusia* membranacea, e margine orta, replicata, interius dehiscentia.

α. *Adianta vera* (*capsulæ ipsis indusiis innatæ*).

* *fronde simplici.*

- X 1. *A. reniforme*, frondibus orbiculato-reniformibus indivisis crenatis. *L.*—*Pluk. Alm. t. 287. f. 5.*
2. *A. philippense*, frondibus e surculo alternis reniformibus lobatis. *Linn.*—*Petiv. Gaz. t. 4. f. 4.*

** *fronde composita.*

3. *A. triphyllum*, fronde triphylla, foliolis sessilibus lanceolatis pinnatifidis crenatis. *Lam. Encycl.*—*Smith ined. ic. 74.*
4. *A. radiatum*, fronde digitata, foliolis pinnatis, pinnis oblongis sursum auritis subcrenatis. *L.*—*Plum. Fil. t. 100.*
- X 5. *A. pedatum*, fronde pedata, foliolis pinnatis, pinnis rhombeo-

rhombeo-oblongis sublunatis inciso-lobatis. *L.—Pluk. Alm. t. 124. f. 2.*

6. *A. flabellulatum*, fronde subpedata, foliolis pinnatis, pinnis rhombeo-rotundatis crenulatis, stipite pubescente. *L.—Adiantum fuscum Retz. Obs. 2. 28. t. 5.*

7. *A. lunulatum*, frondibus pinnatis, pinnis alternis lunulatis subintegris radiato-venosis margine superiore fructificantibus, lineolis confluentibus. *Willd. Phyt. 1. t. 9. f. 1.—Retz. Obs. 2. t. 4.—Pteris lunulata.*

8. *A. cultratum*, frondibus pinnatis, pinnis deltoideo-lanceolatis obtusis, terminali elongata. *Willd. Phyt. 1. t. 9. f. 2.*

9. *A. pumilum*, frondibus pinnatis, pinnis subrotundis serrulatis, terminali majore trapezoidea, punctis fructiferis margine superiori subsolitariis. *Flor. Ind. Occ.—Pluk. Alm. t. 251. f. 4.*

10. *A. caudatum*, frondibus pinnatis apice caudatis radican-
tibus, pinnis deorsum falcatis, superne incisis, laciniis emarginatis. *Linn.—A. incisum Forsk.—Burm. Zeyl. t. 5. f. 1.*

11. *A. macrophyllum*, frondibus pinnatis, pinnis oppositis trapeziis acutis, summa majori, infimis subhastatis reflexis, linea fructif. antice et postice continua. *Brown. Jam. t. 38. f. 1.*

12. *A. deltoideum*, frondibus pinnatis inferne subbipinnatis, pinnulis deltoideis obtusis summa triangulari, lineolis margine superiore et inferiore fructificantibus. *Fl. I. Occ.*

*** fronde decomposita.

13. *A. serrulatum*, frondibus pinnatis bipinnatisve pinnulis dimidiatis deltoideis oblongis subfalcatis serrulatis margine superiore fructificantibus. *Linn.—Sloane H. 1. t. 35. f. 2. simplex.*

14. *A. denticulatum*, frondibus pinnatis bipinnatisve, pinnulis trapezoideis oblongis acuminatis subcrenato-denticulatis

culatis margine superiore fructificantibus. *Fl. Ind. Occ.*
—*Plum. Fil. t. 52.* (simplex).—*A. latifolium Lam.*

15. *A. falcatum*, frondibus pinnatis bipinnatisve, pinnulis trapezoideis acuminatis falcatis apice serratis, linea fructificante antice et superne continua. *Flor. Ind. Occ.*—*Sloan. H. 1. t. 55. f. 1.*—*Pluk. Ph. t. 253. f. 1.*

16. *A. lanceum*, frondibus bipinnatis, pinnis pinnulisque oppositis oblongis, terminalibus triangulari-hastatis. *L.*
—*Seba Mus. 2. t. 64. f. 7. 8.*

17. *A. cristatum*, frondibus bipinnatis, pinnis infimis bipartitis, pinnulis oblongis postice truncatis superne inciso-lobatis. *Linn.*—*Plum. Fil. t. 97. ?*

18. *A. striatum*, frondibus bipinnatis, pinnis infimis bipartitis, pinnulis rhombeis subfalcatis striatis rigidis, stipite tereti scabro. *Fl. Ind. Occ.*—*Jacq. Ic. rar.**

19. **A. hispidulum*, frondibus bipinnatis, pinnis infimis bipartitis, pinnulis rhombeis subfalcatis striatis hispidulis, stipite rachive angulato-hispidis.*

20. *A. villosum*, frondibus bipinnatis, pinnis trapezio-oblongis obtusis, lineolis antice et superne fructificantibus, stipite rachibusque villosis. *L.*—*Sloane H. 1. t. 55. f. 1. ?*

21. *A. pulverulentum*, frondibus bipinnatis, pinnulis rhombo-ovalibus apice serratis, linea fructif. margini superiori solitaria, stipite hirsuto. *L.*—*Plum. Fil. t. 33.*

X 22. *A. capillus*, fronde decomposita, pinnulis cuneatis apice rotundatis lobatis, lobis fructiferis. *Linn.*—*Jacq. Misc. Austr. 2. t. 7.*

**** fronde supradecomposita.

23. *A. tenerum*, pinnulis rhombeis obtusatis, superne inciso-lobatis, lobis denticulatis fructiferis. *Fl. Ind. Occ.*
—*Pluk. Alm. t. 254. f. 1.*

24. *A. fragile*, pinnulis cuneato-obovatis superne crenatis, crenis fructiferis. *Fl. Ind. Occ.*

25. **A. assimile*,

25. **A. assimile*, pinnulis rhombeo-subrotundis radiato-venosis antice crenulatis, crenis fructiferis.*
26. *A. trapeziforme*, pinnulis rhombeis acuminatis, antice et superne inciso-crenatis, crenis fructiferis. *Linn.—Plum. Fil. t. 95.*
27. *A. æthiopicum*, pinnulis cuneatis superne rotundatis inciso-lobatis crenulatis, lobis emarginatis fructiferis, indusiis reniformibus. *Linn.—Pluk. Alm. t. 253. f. 2.—Houtt. N. H. 2. t. 100. f. 3.*
28. **A. pallens*, pinnulis ovato-rhombeis obtusis sursum incisis infimisque basi auritis.*

β. *Adianta spuria* (*Capsulæ* in punctis marginalibus distinctis, *indusiis* squamiformibus tectæ, nec innatæ).

29. *A. viride*, frondibus bipinnatis, pinnulis ovatis integris, terminalibus majoribus ovato-lanceolatis subhastatisve, stipite lævi.—*Vahl. Symb. 3. 104.—Pteris viridis. Forsk.*
30. *A. microphyllum*, frond. bipinnatis lanceolatis utrinque stipiteque pubescentibus, pinnulis oblongis obtusis crenulatis, infimis subpinnatis. *Fl. I. Occ.—Plum. Fil. t. 58.*
31. *A. fragrans*, frondibus bipinnatis, pinnulis ovatis obtusis sublobatis subtus nudis, stipite paleaceo.—*Polypod. fragrans Linn. Mant.—Pluk. Alm. 150. t. 281. f. 4.*
32. *A. caffrorum*, frondibus bipinnatis tripinnatifidisque hirtis, pinnulis ovatis crenulatis subtus rachibusque paleaceo-hirtis. *Linn.*
33. **A. parvilobum*, frondibus bipinnatis glabris, pinnulis remotis trilobatis convexis crenulatis, medio oblongo, lateralibus subrotundis, rachibus paleaceo-hirtis.*
34. *A. capense*, frondibus supradecompositis, pinnulis ovatis indivisis coadunatis crenulatis, fructificationibus contiguis. *Thunb. Prodr.*
35. *A. pteroides*, frondibus supradecompositis, foliolis tripinnatis, pinnulis cordato-ovatis crenulatis, punctis con-
- tiguis,

- tiguis, indusiis imbricatis, stipite glaberrimo.—*Pteris orbiculata* Linn.—Thunb. Houytt. N. H. ii. 14. t. 96. f. 3.
36. *A. tenuifolium*, frondibus supradecompositis, foliolis laxis subbipinnatis, pinnulis oblongis crenatis.—*Pteris humilis* Forst.*
37. **A. multifidum*, frondibus supradecompositis, foliolis tripinnatifidis glabris, lacinulis obovatis convexis incisocrenatis.*

Inquirenda.

Filix arborescens adiantoides major Plum. Fil. t. 6.

————— minor *ibid.* t. 7.

Adiantum lunulis albicantibus signatum *ibid.* t. 96.

————— nigrum non ramosum majus Sloane H. 1.
t. 55. f. 2.

————— incisum Forskål Flor. Æg. Arab.

————— cicutæfolium Lam. Encycl. (an *A. tenuifolium*?)

19. DAVALLIA SMITH.

CHAR. *Capsulæ* in puncta versus apices crenarum frondis distincta, dispositæ.—*Indusium* membranaceum semicucullatum, unoquoque puncto distinctum subtruncatum, exterius dehiscens.

1. *D. heterophylla*, frondibus sterilibus simplicissimis ovato-lanceolatis acutis integris, fertilibus lineari-lanceolatis sinuatis. Smith.
2. *D. pectinata*, frondibus lanceolatis pectinato-pinnatifidis, laciniis obtusis undulatis, infimis auriculatis semipinnatisve. Smith.
3. *D. contigua*, frondibus lineari-lanceolatis pinnatifidis, pinnis coadunatis linearibus obtusis subincisis.*—*Trichomanes contiguum* Forst.
4. **D. falcata*, frondibus pinnatis, pinnis lanceolatis subfalcatis basi truncatis sursum auritis, punctis fructiferis tomentos.*

5. *D. pedata*,

3. *D. pedata*, frondibus quinquangulis trifidis pinnatifidis.
—*Adiantum repens* L.
6. *D. hirsuta*, frondibus subbipinnatis pubescentibus, pin-
nulis coadunatis lanceolato-falcatis antrorsum crenatis.*
—*Trichomanes hirsutum* Thunb. Fl. Jap.
7. *D. elata*, frondibus decompositis, foliolis pinnatifido-in-
cisis, laciniis oblongis apice serratis.*—*Trichomanes*
elatum Forst.
8. *D. solida*, frondibus decompositis, foliolis acuminatis,
pinnis ovato-oblongis incisis crenatis, crenis obtusis.*—
Trichom. solidum Forst.
9. **D. elegans*, frondib. decompositis, foliolis apice attenu-
atis, pinnis lanceolatis incisis serratis, serraturis emargi-
natis.*—*Trichomanes denticulatum* Houytt. N. H. 2.
t. 100. f. 2.
10. *D. cuneiformis*, frondibus alternatim decompositis,
lacinulis ovato-cuneiformibus incisis, punctis fructiferis
geminatis.—*Trichomanes cuneiforme* Forst.*
11. *D. clavata*, fronde alternatim decomposita, lacinulis
lineari-cuneiformibus obtusis, puncto solitario.—*Adian-*
tum clavatum Linn.—*Plum. Fil.* t. 101.
12. *D. chinensis*, frondibus alternatim decompositis, foliolis
tripinnatifidis, lacinulis cuneiformibus obtusis, punctis
subgeminis.—*Trichom. chinense* L.—*Osbeck It. Chin.*
t. 6.—*Pluk. Phyt.* t. 4. f. 1.
13. **D. tenuifolia*, frondibus alternatim decompositis, foli-
olis subquadripinnatifidis, lacinulis lineari-cuneiformibus
retusis, punctis geminatis.*—*Adiant. tenuifolium* Lam.
14. *D. gibberosa*, frondibus tripinnatis, pinnis oblongis
pinnatifido-incisis, laciniis linearibus, gibbis margine in-
feriore fructiferis.—*Trichom. gibberosum* Forst.
15. *D. epiphylla*, frondibus tripinnatifidis, foliolis apice
attenuatis, pinnis lanceolatis, laciniis inciso-serratis.*—
Trichomanes epiphyllum Forst.

- X 16. *D. canariensis*, frondibus tripartitis alternatim decompositis, lacinulis lanceolatis, fructiferis obovatis.—Trichom. canariense L.—Cænopteris canariensis Willd. Phyt.—Jacq. Ic. rar.
17. *D. aculeata*, fronde supradecomposita, pinnulis cuneiformibus obtusis subpalmato-lobatis, lobis cuneatis, punctis geminis, rachi flexuosa aculeata.—Adiant. aculeatum L.—Plum. Fil. t. 94.
18. *D. fumarioides*, fronde supradecomposita, pinnulis subpalmatis bipartitis, lacinulis linearibus unipunctatis, rachi flexuosa aculeata. Flor. Ind. Occ.—Trichom. aculeatum Prodr.—Acrostichum aculeatum Linn.
19. **D. scandens*, fronde supradecomposita, pinnulis cuneatis rhombeis inciso-crenatis, crenis bipunctatis, rachi flexuosa inermi.*—Adiant. scandens Loureiro Coch. 837.

Inquirendæ.

Adiantum trilobum Linn.

———— trifoliatum Linn.†

———— chusanum Linn.

———— capillaceum Plum. Fil. t. 99. D.‡

Trichomanes capillaceum Linn.

Adiantum tenuiter divisum Plum. Fil. t. 99. A.

———— ibid. t. 99. C.

20. DICKSONIA L'HERIT.

CHAR. Capsulæ in puncta subrotunda distincta submarginalia s. terminalia digestæ.—Indusium duplex: alterum superficialium squamiforme exterius dehiscens, aliud e parte opposita frondis, alterum sæpe complectens, interius dehiscens.

† Vid. Plum. Fil. tab. 99. B.: Adiantum triphyllum et retusum.—ED.

‡ Est Trichomanes capillaceum L. (an et T. trichoides Sw.?)—ED.

1. *D. integra*, arborescens, frondibus subbipinnatis pubescentibus, pinnis lato-lanceolatis, pinnulis oblongis integris basi coadunatis.—*D. arborescens* L'Her. Sert. Angl.
2. *D. squarrosa*, arborea, frondibus subbipinnatis, pinnis oblongis acuminatis, pinnulis basi coadunatis lanceolatis mucronato-serratis, rachibus hispido-pilosis.—*Trichomanes squarrosum* Forst.
- X 3. *D. calcita*, frondibus supradecompositis glabris, foliolis pinnisque rhombeis, pinnulis ovatis incisissimis pinnatifidisque, laciniis dentatis, stipite glabro, L'Her. Sert. Angl.
4. *D. flaccida*, frondib. supradecompositis glabris, pinnulis rhombeis oblongis acutiusculis inciso-pinnatifidis, laciniis cuneatis obtusis bidentatis gibbis, stipite pubescente.*—*Trichomanes flaccidum* Forst.
5. *D. dissecta*, frondibus supradecompositis, pinnulis oblongis obtusis sinuato-pinnatifidis, laciniis obtusis gibbis subcrenulatis. Fl. Ind. Occ.—Polyp. dissectum Prodr.
6. *D. cicutaria*, frondibus supradecompositis, pinnulis oblongis inciso-pinnatifidis, laciniis ovatis acutis serrulatis, infima majore. Fl. Ind. Occ.—Sloane H. 1. f. 57. f. 1. 2.
7. *D. apiifolia*, frondibus decompositis, foliolis trapeziis, pinnulis cuneatis oblongis serratis, inferioribus basi superne auritis. Flor. Ind. Occ.
8. *D. polypodioides*, frondibus decompositis, foliolis bipinnatis, pinnulis rhombeo-ovatis decurrentibus obtusis inciso-dentatis pubescentibus, stipite scabro.*—*Polypod. nudum* Forst.
9. **D. zeylanica*, frondibus supradecompositis, pinnulis oblongis obtusis sinuato-pinnatifidis, laciniis obovatis gibbis dentatis, stipite glabro.*
10. *D. multifida*, frondibus supradecompositis, pinnulis ovatis acuminatis inciso-pinnatifidis, laciniis ovatis serrulatis, stipite pubescente.*—*Ctenopteris japonica* Willd. Phyt. t. 8. f. 1. foliolum.
11. *D. strigosa*, frondibus bipinnatis, pinnis ensiformibus, pinnulis

pinnulis rhombeo-oblongis acutiusculis incisiss laciniis obovatis dentatis, stipite rachibusve pubescentibus.—

Trichomanes strigosum Thunb. Jap.

12. **D. japonica*, frondibus subbipinnatis, pinuis ensiformibus, pinnulis rhombeo-ovatis obtusis serratis stipiteque pubescentibus.*—*Houtt N. H. 2. t. 99. f. 3.* sub var. *Polyp. cristati*.

13. *D. marginalis*, frondibus pinnatis, pinnis ensiformibus sursum auriculatis incisiss, superioribus coadunatis, stipite villosis.*—*Polyp. marginale Thunb. Jap.*

Inquirendæ.

Filix altissima globuligera major Plum. Fil. t. 30.

————— minor *ibid. t. 31.†*

21. CYATHEA SMITH.

CHAR. *Capsulæ* in puncta subrotunda sparsa collocata, receptaculo columnari adsidentes, intra *Indusium* calyciforme superne dehiscens.

1. *C. arborea*, caudice arboreo squamoso, foliolis bipinnatis, pinnulis lanceolatis acutiusculis serratis.—*Polyp. arboreum L.*—*Cyathea Smith.*—*Plum. Fil. t. 1.*
2. **C. excelsa*, caudice arboreo squamoso, foliolis subbipinnatis, laciniis oblongis acutiusculis apice serratis, punctis fructificantibus ad basin subsolitariis.*
3. *C. extensa*, caudice arboreo—, foliolis bipinnatis, pinnis acuminatis apice serratis, pinnulis oblongis serratis, rachibus punctato-asperis.*—*Polyp. extensum Forst.*
4. *C. aspera*, caudice arboreo aculeato—, foliolis subbipinnatis—, pinnulis coadunatis oblongis obtusis apice serratis.—*Polyp. asperum Linn.*—*Plum. Fil. t. 3.*

† Est *Dicksonia dissecta* (*Polyp. dissectum Sw. Prodr.*)—ED.

5. *C. dealbata*,

5. *C. dealbata*, caudice arboreo—, foliolis bipinnatis, pin-
nulis oblongis subfalcatis serratis subtus albis, rachibus
asperis.*—Polypod. dealbatum Forst.
6. *C. multiflora*, caudice—, foliolis subbipinnatis, laciniis
obtusis serratis, rachibus alatis. Sm.
7. *C. medullaris*, caudice arboreo hispido—, foliolis bipin-
natis, pinnis attenuatis, pinnulis sessilibus oblongis sub
falcatis crenatis, rachibus asperis.*—Polypod. medul-
lare Forst.
8. *C. affinis*, frondibus bipinnatis, pinnis acuminatis, pin-
nulis lineari-oblongis crenatis, stipite rachibusque hir-
tis.*—Polypod. affine Forst.
9. *C. horrida*, decomposita, foliolis bipinnatifidis, pinnis
lato-lanceolatis, laciniis subfalcatis acutis apice serratis
marginem versus fructiferis, stipite aculeato.—Polypod.
horridum L.—Plum. Fil. t. 8.

Inquirenda.

Filix arborescens humilis et spinosa Plum. Fil. t. 4.

22. TRICHOMANES LINN.

CHAR. Capsulæ confertæ in punctis marginalibus sub-
exsertis, columnulæ adsidentes, intra Indusia urceo-
lata, monophylla, exterius hiantia.

* fronde simplici.

1. *T. reniforme*, frondibus reniformibus stipitatis. Forst.*
—Hedw. Ic. Fil.
2. *T. membranaceum*, frondibus incumbentibus oblongis
integris lacerisque, margine peltato-squamulosis. Linn.
—Plum. Fil. t. 101. a.
3. *T. muscoides*, frondibus incumbentibus cuneato-oblongis
repandis, urceolis fructiferis exsertis. Flor. Ind. Occ.—
T. hymenoides Hedw. Ic. Fil.

4. *T. pusillum*, frondibus erectiusculis linearibus integris subdivisisque, urceolis exsertis. *Flor. Ind. Occ.*
5. *T. reptans*, frondibus erectis cuneato-ovatis incisis pinnatifidisque, urceolis exsertis. *Flor. Ind. Occ.—Hedw. Ic. Fil.*
6. *T. crispum*, frondibus lanceolatis subpinnatis, laciniis parallelis obtusis subserratis. *Linn.—Hedw. Ic. Fil.—Plum. Fil. t. 86.*

**** fronde composita.**

7. *T. pinnatum*, frondibus pinnatis, pinnis oblongo-lanceolatis integris, superioribus decurrenti-condunatis. *Hedw. Ic. Fil.*
8. *T. guineense*, frondibus pinnatis, pinnis oblongis decurrentibus inciso-pinnatifidis, laciniis obtusis subserratis, costa stipiteque marginatis. *Afzel.*
9. *T. pyxidiferum*, frondibus acuminatis tripinnatifidis, laciniis linearibus obtusis, urceolis axillaribus terminalibusque subpedicellatis, costa stipiteque marginatis. *Linn.—Plum. Fil. t. 50. E.—Hedw. Ic. Fil.*
10. *T. humile*, frondibus dichotomis bipinnatifidis, pinnis decurrentibus laciniis linearibus obtusis, urceolis axillaribus, stipite brevissimo. *Forst.—Hedw. Ic. Fil.*
11. *T. crinitum*, frondibus bipinnatifidis obtusis hirtis, pinnis ovatis decurrentibus, laciniis obtusis bilobisque, stipite tereti hirtio. *Flor. Ind. Occ.—Hedw. Ic. Fil.*
12. *T. alatum*, frondibus bipinnatifidis attenuatis hirtis, pinnis acuminatis, laciniis acutis apice serratis, stipite costaque alatis. *Fl. Ind. Occ.—Plum. Fil. t. 50. D.*
13. *T. lucens*, frondibus bipinnatifidis longissimis, pinnis parallelis lanceolatis, laciniis subrotundis crispis, stipite hirsutissimo. *Fl. Ind. Occ.—Hedw. Ic. Fil.*
14. *T. radicans*, frondibus tripinnatifidis, — laciniis obtusis bifidis, urceolis subpedicellatis, stipite rachique marginatis,

natis, surculo scandente. *Flor. Ind. Occ.*—*T. scandens* Hedw. *Ic. Fil.*

15. *T. scandens*, frondibus tripinnatifidis, — laciniis obtusis integris, urceolis insertis, stipite rachive tereti, surculo scandente radicante. *L.—Plum. Fil. t. 93.*

16. *T. tamarisciforme*, frondibus bipinnatis, pinnulis pinnatifido-lobatis, lobulis oblongis, urceolis insertis, stipite rachive teretibus pilosiusculis. *Jacq. Coll. 3. t. 21. f. 3.*

17. *T. rigidum*, frondibus subquadripinnatifidis deltoideis erectis, — laciniis linearibus incisis acutis, urceolis axillaribus pedicellatis, stipite tereti rigido. *Fl. Ind. Occ.—Hedw. Ic. Fil.*

18. *T. trichoideum*, frondibus supradecompositis oblongis capillaceis erectis, — lacinulis bipartitis, urceolis supra-axillaribus. *Fl. Ind. Occ.*—*T. pusillum* Hedw. *Ic. Fil.*

Inquirenda.

Trichomanes polypodioides Linn.

———— hirsutum Loureiro *Cochinch.*

———— elegans Richard *Act. Soc. H. N. Par. 1.*

23. HYMENOPHYLLUM SMITH.

CHAR. Capsulæ in puncta marginalia subexserta confertæ, columnulæ adsidentes, intra *Indusia* bivalvia, planiuscula, recta, exterius hiantia.

1. *H. asplenoides*, frondibus pendulis lanceolatis pinnatifidis, laciniis lobatis.—*Trichom. asplenoides* *Flor. Ind. Occ.—Hedw. Ic. Fil.*

2. *H. hirsutum*, frondibus pinnatis lanceolatis laxis hirtis, costa marginata, pinnis simplicibus linearibus digitatisve.—*Trichom. hirsutum* *L.—Plum. Fil. t. 50. B.—Hedw. Ic. Fil.*

3. *H. decurrens*, frondibus bipinnatifidis, pinnis oblongis decurrentibus,

- decurrentibus, laciniis obtusis integris subciliatis, stipite marginato.—*Adiant. decurrens Jacq. Coll. 2. t. 2. f. 1. 2.*
4. *H. sericeum*, frondibus bipinnatifidis lanceolatis subtomentosis pendulis, — laciniis linearibus obtusis integris, baseos bifidis, indusiis hirsutis.—*Trichomanes sericeum Prodr.—Hedw. Ic. Fil.—Plum. Fil. t. 73.*
5. *H. bivalve*, frondibus bipinnatis ovatis acutis, pinnis decurrentibus dichotomis, laciniis linearibus serratis.*—*Trichom. bivalve Forst.*
6. *H. fucoides*, frondibus bipinnatis ovatis, pinnis decurrentibus, pinnulis simplicibus bipartitisve serratis, fructificationibus supra-axillaribus subgeminatis. *Fl. Ind. Occ.—Trichom. fucoides Prodr.—Hedw. Ic. Fil.*
7. *H. tunbridgense*, frondibus subbipinnatis ovatis, pinnis decurrentibus pinnulisque serratis, fructificationibus supra-axillaribus solitariis.—*Trichom. tunbridgense L.—Eng. Bot. 162.—Fl. Dan. 954.—Hedw. Ic. Fil.*
8. *H. lineare*, frondibus bipinnatis pendulis, pinnulis linearibus integris bipartitisque subciliatis. *Fl. Ind. Occ.—Trichom. lineare Prodr.*
9. *H. ciliatum*, frondibus bipinnatis deltoideis, pinnis decurrentibus, pinnulis linearibus obtusis subbipartitis ciliatis, stipite marginato. *Fl. Ind. Occ.—Hedw. Ic. Fil.*
10. *H. dilatatum*, frondibus bipinnatis ovato-lanceolatis, pinnis cuneiformibus decurrentibus dichotomis, lacinulis obtusis integris, indusiis inflatis.—*Trichom. dilatatum Forst.*
11. *H. demissum*, frondibus bipinnatis ovatis acutis strictis, pinnis dichotomis, lacinulis linearibus obtusis integris apice bifidis, indusiis globosis.*—*Trichom. demissum Forst.—Hedw. Ic. Fil.*
12. *H. denticulatum*, frondibus bipinnatis ovatis, pinnis decurrentibus dichotomis, laciniis linearibus obtusiusculis sinuato-denticulatis.*
13. *H. sanguinolentum*, frondibus subtripinnatifidis rhombeis,

- beis, pinnis dichotomis decurrentibus, lacinulis integris obtusis lineari-oblongis bipartitisve.*—Trichom. sanguinolentum *Forst.*—*Hedw. Ic. Fil.*
14. *H. undulatum*, frondibus tripinnatifidis bipinnatisve laxis, pinnis decurrentibus, lacinulis linearibus retusis crenulato-undulatis. *Fl. Ind. Occ.*—Trichom. undulatum *Prodr.*—*Hedw. Ic. Fil.*
15. *H. emarginatum*, frondibus subtripinnatis oblongis, pinnis decurrentibus dichotomis, pinnulis bipartitis, lacinulis linearibus emarginatis, terminalibus elongatis.*
16. *H. axillare*, frondibus subtripinnatis, pinnulis linearibus obtusis subemarginatis, fructificationibus supra-axillaribus pedicellatis. *Flor. Ind. Occ.*
17. *H. hirtellum*, frondibus tripinnatis siccitate circinatis costa marginata, pinnulis linearibus acutiusculis hirtis. *Flor. Ind. Occ.*
18. *H. clavatum*, frondib. tripinnatis oblongis acutis, costa submarginata, pinnulis linearibus emarginatis. *Fl. Ind. Occ.*—Trichom. clavatum *Prodr.*—*Hedw. Ic. Fil.*
19. *H. polyanthos*, frondibus tripinnatis deltoideis, costa stipiteque marginatis, pinnulis linearibus obtusis integris. *Fl. I. Occ.*—Trichom. polyanthos *Prodr.*—*Hed. Ic. Fil.*
20. *H. multifidum*, frondibus decompositis, pinnis decurrentibus dichotomis, lacinulis linearibus argute serratis, fructificationibus supra-axillaribus solitariis.—Trichom. multifidum *Forst.**

Inquirendum.

Adiantum tenellum *Jacq. Coll. iii. t. 21. f. 3.*

24. SCHIZÆA SMITH.

CHAR. *Capsulæ* appendiculo frondis insidentes ejusque dorsum tegentes.—*Indusia* e marginibus appendiculi inflexis, continua.

- X 1. *S. pectinata*, fronde simplici nuda, appendiculis secundis conniventibus.—*Acrostichum pectinatum* L. *Am. Ac.* 1. t. 12. f. 4. 5.
- Y 2. *S. dichotoma*, fronde dichotoma, laciniis linearibus, appendiculis frondis conniventibus.—*Acrost. dichotom.* L.
3. *S. elegans*, fronde dichotoma, laciniis dilatatis inaequaliter fissis nervosis, appendiculis revolutis.—*Acrost. elegans* Vahl. *Symb.* 2. t. 50.
- X 4. *S. spicata*, fronde simplici lanceolata attenuata, appendiculo unico lineari erecto. *Smith ined.* t. 49.—*Acrost. spicatum* Linn. *Suppl.*

Inquirendum.

Acrostichum digitatum Linn. *Amoen. Ac.* 1. t. 12. (an *Asplenium*?)

B. Exannulatæ.

25. OSMUNDA LINN.

CHAR. *Capsulæ* confertæ, subglobosæ, pedicellatæ, in racemum s. in dorsum frondis dispositæ, uniloculares, bivalves.

* *Caulibus ad basin frondis racemiferis.*

1. *O. phyllitidis*, fronde pinnata, stipite lævi. L.—*Plum. Fil.* t. 156.
2. *O. hirta*, fronde pinnata, stipite hirta. Linn.—*Plum. Fil.* t. 157.
3. *O. hirsuta*, fronde bipinnata hirsuta. Linn.—*Plum. Fil.* t. 162.
4. *O. adiantifolia*, fronde supradecomposita. Linn.—*Plum. Fil.* t. 158.

** *Scapis distinctis racemiferis.*

5. *O. bipinnata*, racemis pinnatis, fronde bipinnatifida. Linn.—*Plum. Fil.* t. 155.

6. *O. cervina*,

6. *O. cervina*, racemis pinnatis, fronde pinnata, pinnis integris. *L.—Plum. Fil. t. 154.*

7. *O. aurita*, racemis pinnatis, racemulis digitatis, fronde inferne bipinnata, superne pinnata, pinnis baseos sursum gibbis. *Fl. Ind. Occ.*

8. *O. verticillata*, racemis verticillatis simplicibus, fronde supradecomposita. *Linn.—Plum. Fil. t. 160.*

9. *O. siliculifolia*, racemis pinnatis, fronde supradecomposita. *Linn.—Plum. Fil. t. 161.*

**** frondibus omnibus fructiferis.**

10. *O. Claytoniana*, frondibus pinnatis, pinnis pinnatifidis apice coarctato-fructificantibus. *Linn.*

11. *O. regalis*, fronde bipinnata, racemo terminali supradecomposito. *L.—Fl. Dan. t. 217.—Plum. Fil. t. B. f. 4.*

12. *O. totta*, fronde subbipinnata, pinnulis lanceolatis serrulatis, fructiferis subtus venis capsuliferis. *Thunb. Prodr. Cap.—Acrost. barbarum L.—Pluk. Alm. t. 181. f. 5.*

****** frondibus fructiferis distinctis.**

✓ 13. *O. cinnamomea*, frondibus bipinnatifidis, fructiferis hirsutis, racemis compositis. *Linn.*

14. *O. japonica*, frondibus bipinnatis, pinnulis cordato-lanceolatis serratis, fructiferis tripinnatis. *Thunb.—Houtt. N. H. ii. t. 96. f. 1.*

15. *O. lancea*, frondibus bipinnatis, pinnulis lanceolatis serratis, fructiferis supradecompositis ternatis. *Thunb.—O. japonica Houtt. N. H. ii. t. 95. f. 1.*

16. **O. thurifera*, frondibus bipinnatis, sterili pinnulis inciso-serratis, fructificantium lobatis, margine capsuliferis.*

Inquirendæ.

Osmunda caroliniana *Walt. Car. p. 287.*

———— *hispanica* *Barrel. Ic. rar. 37.*

Filix virgin. non dentata florida *Pluk. Ph. t. 81. f. 4.*

Filicestrum amer. minus, fol. racemosis hirsutis, Amman in Com. Petr. x. t. 19.

26. LYGODIUM.

CHAR. *Capsulæ* solitariae, intra singulas squamulas imbricatas distichas spicarum marginalium pinnarum frondis sessiles, uniloculares, bivalves. *Semina* numerosa, subrotunda.—(Nomen a *λυγος*, flexilis, tortuosus.)

- ✱ 1. *L. scandens*, caule tereti, frondibus pinnatis, pinnis cordato-lanceolatis subintegris.—*Ophioglossum scandens* Linn.—*Rumpf Amb. vi. t. 32. f. 2.*
2. *L. flexuosum*, caule tereti, frondibus subpalmatis, pinnis lanceolatis subintegris.—*Ophiogloss. flexuosum* Linn.—*O. circinatum* Burm. Ind.—*Rumpf Amb. vi. t. 33.*
3. **L. pedatum*, caule tereti, frondibus dichotomis, pinnis geminatis ensiformibus.*
4. *L. japonicum*, caule angulato, frondibus supradecompositis, pinnulis alternis incisis, fructiferis linearibus.—*Ophiogloss. japon.* Thunb. Jap.—*O. scandens* Osbeck It. Chin.

Inquirenda.

Ruta muraria Clematitis vario folio Plum. Fil. t. 92.

Tsiera-Valli-Panna Rheede Malab. 12. t. 34.

27. GLEICHENIA SMITH.

CHAR. *Capsulæ* ternæ et quaternæ, ovales, sessiles, foveola hemisphærica pinnularum semi-immersæ uniloculares, bivalves. *Semina* numerosa, subrotunda.

- ✱ 1. *G. polypodioides*, rachibus frondium glaberrimis, capsulis ternis.*—*Onoclea polypodioides*. Linn.
2. **G. circinata*, rachibus frondium pubescentibus, capsulis quaternis.*

28. ANGIOPTERIS

28. ANGIOPTERIS HOFFM.

CHAR. *Capsulæ* ovales, sessiles, in lineam prope marginem frondis dispositæ, duplici serie sibi invicem approximatae, uniloculares.

A. evecta—Hoffm. in *Comment. Gotting. vol. xii. p. 29. t. 5.*—*Polypodium evectum* Forst.

29. DANÆA SMITH.

CHAR. *Capsulæ* oblongo-lineares, transverse frondi immersæ, parallelæ, multiloculares: *loculis* duplici serie superne dehiscentibus.* *Semina* numerosa, minima.

1. *D. nodosa*, rachi subsimplici, pinnis acuminatis subintegris ad marginem usque capsuliferis, stipulis acutis.—*Asplen. nodosum* Linn.—*Plum. Fil. t. 108.*
 2. *D. alata*, rachi apice alata, pinnis serrulatis prope marginem nudis, stipulis obtusis erosis. *Plum. Fil. t. 109.*
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30. MARATTIA (MYRIOTHECA Juss.)

CHAR. *Capsulæ* ovales, per paginam frondis sparsæ, multiloculares, superne bipartibiles: *loculis* duplici serie hiantibus. *Semina* numerosa, ovata, minima.

1. *M. alata*, frondibus bipinnatis, pinnulis acute serratis, rachibus squamosis, partialibus alatis. *Fl. Ind. Occ.*—*Smith ined. t. 46.*
2. *M. lævis*, frondibus bipinnatis, pinnulis apice obtuse serratis, rachibus lævibus, partialibus alatis. *Smith ined. t. 47.*
3. *M. fraxinea*, frondibus pinnatis, pinnis lanceolatis serratis, rachibus lævibus. *Smith ined. t. 48.*

C. Genera Filicibus affinia.

31. PSILOTUM.

CHAR. *Capsulae* globosae, subtrilocellae, sparsae, axillari-laterales, sessiles, triloculares: *valvulis* tribus apice dehiscentibus. *Semina* numerosissima. (Nomen a *ψιλοτες*, *nuditas*, quoniam fructus sparsi nudi, caulibus subnudis adnascuntur.

1. *P. triquetrum*, ramis undique triquetris.—*Lycopodium nudum* L.—*Hoffmannia Roem. Ust. Mag.—Plum. Fil. t. 170. f. A. A.—Dill. Musc. 7. 64. f. 4.*
2. **P. complanatum*, ramis planis.*

32. BOTRYCHIUM.

CHAR. *Capsulae* subglobosae, distinctae, in spicam racemosam congestae, adnatae, uniloculares, ab apice ad basin dehiscentes.—*Semina* numerosa ovata.* (Etymol. *βοτρυδον*, racematim s. in modum racemi, s. *βοτρυτες*, *Gemma* incipienti uvae similis. *Plin.* 37. 10.)

1. *B. Lunaria*, fronde solitaria pinnata, pinnis lunatis.—*Osmunda Lunaria* Linn.—*Fl. Dan. t. 18.—Act. N. N. C. 1. t. 2. f. 1. 2. 8—11.*
2. *B. rutaceum*, frondibus subsolitariis bipinnatis, pinnis ovatis incisis.—*Osmunda Lunaria* β. γ. Linn.—*Act. N. N. C. 1. t. 2. f. 3—6.—Osmunda Matricariae Breyn. Cent. t. 94. Buxb. Schrank.—var. Lunaria racemosa multifido folio C. B.—Breyn. Cent. t. 95.—Osmunda lanceolata Gmel. Comm. N. Petr. 12. t. 11. f. 2.*
3. *B. virginianum*, fronde supradecomposita, pinnulis pinatifido-incisis, spica bipinnata.—*Osmunda virginiana* Linn.—*Plum. Fil. t. 159.*

4. *B. ternatum*,

4. *B. ternatum*, fronde bipartita supradecomposita, pinnulis inciso-serratis, spica pinnata.—*Osmunda ternata* Thunb. *Fl. Jap.* t. 32.
5. *B. zeylanicum*, fronde verticillato-pinnata, pinnis lanceolatis.—*Osm. zeylanica* L.—*Rumpf Amb.* 6. t. 68. f. 3.

Inquirendæ.

Osmunda multifida Gmel. *N. Comm. Petr.* 12. t. 11. f. 1.

(*β. virginicæ* valde affinis.)

Lunaria Botrychis ramosa &c. *Pluk. Phyt.* t. 427. f. 5.

—— multifido folio crassa &c. *ibid.* t. 427. f. 7.

33. OPHIOGLOSSUM LINN.

CHAR. *Capsulæ* subglobosæ, in spicam subarticulatam disticham connatæ, uniloculares, transverse dehiscentes. *Semina* subrotunda, pulverulenta.

1. *O. vulgatum*, fronde ovata. *Linn.—Plum. Fil.* t. 36. t. B. f. 5.—*Fl. Dan.* 147.
2. *O. lusitanicum*, fronde lanceolata. *Linn.—Barrel. Ic.* t. 252. f. 2.
3. *O. reticulatum*, fronde cordata. *L.—Plum. Fil.* t. 164.
4. *O. nudicaule*, frond. ovatis, scapo distincto. *L. Suppl.**
5. *O. pendulum*, fronde lineari longissima indivisa. *L.—Rumpf Amb.* 6. t. 37. f. 3.
6. *O. palmatum*, fronde palmata. *L.—Plum. Fil.* t. 111. f. 2.

Inquirenda.

Osmunda Crotalophoroides Walt. *Car.* p. 256.

—— simplex *Rumpf Amb.* 6. t. 68. f. 2.

—— fronde bissecta &c. *Brown Jamaica* 108.

—— *Marianum lingua dentata* *Petiv. Phil. Tr.* 248.

Dwarf Smyrna Adders-tongue *Petiv. Gaz.* t. 37. f. 6.
(forte var. *O. lusitan.*)

34. LYCOPODIUM

34. LYCOPODIUM LINN.

CHAR. *Capsulæ* reniformes, axillares, sessiles, bivalves, elastice dehiscentes. *Semina* numerosa, minutissima.

* *Fructificationes in axillis foliorum sessiles.*

1. *L. linifolium*, foliis alternis remotis lanceolatis. *Linn.—Plum. Fil. t. 166. f. C. C.*
2. *L. Myrsinites*, foliis sparsis subdistichis ovato-acutis laxis, caule ramoso repente. *Lamarck Encycl.*
3. *L. dichotomum*, foliis alternis sparsis lineari-acuminatis patulis, caule declinato assurgente dichotomo, ramis patulis. *Flor. Ind. Occ.—Jacq. H. Vindob. 3. t. 45.*
4. *L. Gnidioides*, foliis ternis imbricatis lanceolatis obtusis, caule dichotomo, ramis elongatis. *Linn. Suppl.*
5. **L. filiforme*, foliis sparsis quadrifariis lineari-acutis adpressis, caule filiformi dichotomo divaricato.*
6. *L. verticillatum*, foliis octofariis approximatis acerosis, ramis dichotomis flaccidis.—*L. setaceum Lam.—Plum. Fil. t. 166. B.*
7. *L. serratum*, foliis suboctofariis lanceolatis sinuato-serratis. *Thunb. Fl. Jap. t. 38.*
8. **L. javanicum*, foliis suboctofariis patentibus lanceolatis subulatis planis serrulatis basi attenuatis, caule dichotomo erecto.*
9. *L. taxifolium*, foliis sparsis octofariis lineari-lanceolatis planis integerrimis patulis, caule erecto dichotomo. *Fl. Ind. Occ.*
10. *L. Selago*, foliis sparsis octofariis subimbricatis lanceolato-subulatis subconcavis, caule dichotomo erecto fastigiato. *L.—Fl. Dan. t. 104.*
11. *L. rigidum*, foliis sparsis 6—8-fariis lineari-lanceolatis reflexis, inferioribus squarrosis, caule dichotomo. *Flor. Ind. Occ.—L. squarrosum Prodr.—L. reflexum Lam.—Plum. Fil. t. 166. A.*
12. *L. Saururus*,

12. *L. Saururus*, foliis sparsis lineari-lanceolatis dense imbricatis erectis, caule simplici. *Lam.*

**** Fructif. in axillis squamarum spic. terminalium (spicis terminalibus fructiferis).**

13. *L. Phlegmaria*, foliis verticillato-quaternis, spicis dichotomis. *Linn.—Dill. Musc. t. 61. f. 5.*
14. *L. myrtifolium*, foliis quadrifariis lineari-oblongis, spicis filiformibus foliosis.* *Forst.*
15. *L. sanguinolentum*, foliis quadrifariis imbricatis, caulibus repentibus dichotomis, spicis sessilibus tetragonis. *Linn. Am. Ac. 3. t. — f. 26.*
16. *L. alpinum*, foliis quadrifariis imbricatis acutis, caule repente, surculis erectis dichotomis, spicis sessilibus teretibus. *L.—Fl. Dan. t. 79.—Dill. M. t. 38. f. 2.*
17. *L. annotinum*, foliis sparsis quinquefariis patulis subserratis, surculis annotino-articulatis, spicis teretibus sessilibus. *Linn.—Flor. Dan. t. 127.*
18. *L. obscurum*, foliis sparsis 6-fariis, surculis erectis, ramis alternis radiato-dichotomis, spicis teretibus subsessilibus. *Linn.—Dill. Musc. t. 67. f. 12.*
19. *L. clavatum*, foliis sparsis filamentosis, spicis teretibus pedunculatis geminis. *Linn.—Fl. Dan. t. 126.*
20. *L. rupestre*, foliis sparsis filamentosis, spicis tetragonis sessilibus. *Linn.—Dill. Musc. t. 63. f. 11.*
21. *L. cernuum*, foliis sparsis curvatis, caule ramosissimo, spicis cernuis, squamis adpressis membranaceis serrato-ciliatis. *L.—Dill. Musc. t. 63. f. 10.*
22. **L. curvatum*, foliis sparsis curvatis, caule ramosissimo, spicis cernuis, squamis novemfariis serratis patulis.*—*L. arboreum Gmel.—Pluk. Ph. t. 47. f. 9.*
23. *L. squarrosum*, foliis sparsis lineari-subulatis reflexis squarrosis, caule dichotomo, spicis foliosis*. *Forst.*
24. *L. inundatum*, foliis sparsis integerrimis subincurvatis, spicis foliosis. *L.—Dill. Musc. t. 52. f. 7.*
25. *L. alopecuroides*,

25. *L. alopecuroides*, foliis sparsis subumbricatis, linearibus ciliatis, spicis foliosis. *Linn.—Dill. M. t. 62. f. 8.*
26. *L. selaginoides*, foliis sparsis lanceolatis ciliatis patulis, spicis foliosis. *L.—Fl. Dan. t. 70.—Dill. M. t. 68. f. 1.*
27. *L. ophioglossoides*, foliis sparsis lanceolatis glabris subimbricatis, spicis dichotomis caule longioribus. *Lam.*
28. *L. funiculosum*, foliis sparsis lanceolatis, ramis elongatis funiculiformibus, spicis sessilibus longissimis. *Lam.*
29. *L. scariosum*, foliis bifariis imbricatis erectis ovatis, caule dichotomo, spicis cylindricis, squamis scariosis reflexis. *Forst.**
30. *L. complanatum*, foliis bifariis connatis, superficialibus solitariis, spicis geminatis pedunculatis. *L.—Fl. Dan. t. 78.*
31. * *L. volubile*, foliis bifariis patulis distinctis, superficialibus solitariis, spicis subpaniculato-dichotomis, caule sarmentoso, volubili.*
32. *L. carolinianum*, foliis bifariis patulis, superficialibus solitariis, spicis longissime pedunculatis. *L.—Dill. Musc. t. 62. f. 6.*
33. *L. flabellatum*, foliis bifariis, superficialibus distichis, caule erecto tereti usculo. *L.—Dill. Musc. t. 65. f. 5.*
34. * *L. Myosurus*, foliis bifariis, superficialibus distichis, caule tereti subtus sulcato, spicis elongatis laxis. *Afzel.*
35. *L. canaliculatum*, foliis bifariis, superficialibus distichis, caule erecto canaliculato. *L.—Dill. Musc. t. 65. f. 6.*
36. *L. circinale*, foliis bifariis imbricatis, superficialibus geminis, ramis convolutis.—*L. Bryopteris. Linn.—Dill. Musc. t. 66. f. 11.*
37. *L. stoloniferum*, foliis bifariis patentibus, superficialibus oblongis acutis distichis, surculis tetragonis repentibus, inferne subnudis stoloniferis. *Fl. Ind. Occ.—Dill. Musc. t. 66. f. 10.*
38. *L. ornithopodioides*, foliis bifariis patentibus, superficialibus distichis ciliatis, surculis repentibus, spicis teretiusculis sessilibus. *Linn.—Dill. M. t. 66. f. 1. B.*
39. *L. plumosum*,

39. *L. plumosum*, foliis bifariis imbricatis antrorsum basi gibbis, superficialibus semiovatis ciliatis apiculatis, surculis erectiusculis dichotomis, spicis terminalibus sessilibus tetragonis. *Linn.—Dill. M. t. 66. f. 8.*
40. *L. ciliare*, foliis bifariis, superficialibus distichis ciliatis, caule ramoso, spicis foliosis compressis unilateralibus. *Retz. Fasc. 5.—Lyc. proniflorum Lam. ?*
41. *L. helveticum*, foliis bifariis patulis, superficialibus distichis, surculis repentibus dichotomis, spicis bifidis pedunculatis. *L.—Dill. M. t. 64. f. 2.—Jacq. Austr. 2. t. 196.*
42. *L. denticulatum*, foliis bifariis patulis, superficialibus imbricatis, surculis repentibus, spicis geminatis sessilibus. *L.—Lyc. radicans Schrank ?—Dill. M. t. 66. f. 1. A.*
43. *L. apodum*, foliis bifariis alternis minoribus, caule repente, spicis subgeminatis sessilibus. *Linn.—Dill. Musc. t. 64. f. 3.*
44. * *L. depressum*, foliis bifariis alternis denticulatis patulis, superficialibus distichis subæqualibus ciliatis, spicis oblongis sessilibus foliosis.*

Inquirenda:

Lyc. japonicum. *Thunb. Fl. Jap.* (*L. clavato* simillimum, fructificatio ignota.)

— *radiatum* *Aubl.—Dill. Musc. t. 65. f. 7.*

— *dubium* *Retz.—Flor. Scand. Prodr.*

— <i>pinnatum</i>	} <i>Lamarck Encyclop.</i>
— <i>pectinatum</i>	
— <i>pennæforme</i>	
— <i>squarrosum</i>	
— <i>porelloides</i>	
— <i>lævigatum</i>	

— *rupestre* *Walt. Carol.*

Lycopodioides dichotomum *taxiforme*. *Breyn.—Dill. Musc. t. 66. f. 9.*

Selago Americana foliis denticulatis reflexis. *Dill. Musc. t. 56. f. 2.*

✓ **XXVIII.** *Some Account of Don JOSEPH CELESTINE MUTIS, Chief of the Spanish Botanical Expedition to Santafe de Bogotá, in South America.*

THE naturalists of the day may not unaptly be divided into three classes: the first consisting of such as happily unite the qualifications of actually observing the object of their studies, and of recording in a perspicuous manner the progress of their labours; the second, of those who, unfortunately for the public, observe without writing; and the third, of those who, as unfortunately for themselves as for the public, write without observing. It is obvious that none claim in a higher degree the attention of the contemporary biographer than those of the second class, whose names, unless perpetuated by their collateral merits, are scarcely ever seen to grace the pages of the history of that science the boundaries of which they are continually extending. 'It is upon this ground that we deem it our duty to lay before our readers a brief sketch of the life of Don Joseph Celestine Mutis, a name which, from being so often honourably mentioned by Linnæus and others of his correspondents, has become familiar to the generality of students in natural history, though most of them are entire strangers to the particulars of the life of the veteran naturalist himself: nor should we have been enabled to give the following account of him, but for the kindness of Don Pedro d'Oríbe y Vargas, the gentleman mentioned in one of the miscellaneous articles of our preceding number, and well known to the English reader by an ingenious memoir on the remarkable efficacy of certain plants against the bite of serpents (Tilloch's Philosophical Magazine, vol. xii. p. 36. seq.), and who, as the pupil and friend of Mutis, is best qualified to furnish the materials for his life.

Don Joseph Celestine Mutis was born at Cadiz, in 1734,

of an Italian father and a Spanish mother. His parents, with a view of profiting by the early inclination he discovered for the sciences, intended him for the profession of medicine; and accordingly placed him under the tuition of Don Pedro Virgilio, a surgeon of eminence, then a professor in the military academy of Cadiz, and honourably mentioned by Lœffling in his letters to Linnæus. Here he remained until 1755, when he removed to Seville for matriculation in the university of that city. In the meanwhile the declining health of Ferdinand VI. of Spain, and of his consort, having caused all the most celebrated medical practitioners of the kingdom to be summoned to the court at Madrid, Pedro Virgilio was of the number; and he, from amongst the rest of his pupils, selected Mutis as the companion of his journey. In this capital our young adventurer soon acquired many friends, and not a small degree of reputation; but among his most eminent patrons was Don Ricardo Wall, then minister of state, by whom a pension from the king was proposed to Mutis, for the purpose of enabling him to travel. Owing however to the death of Ferdinand, and a consequent change in the ministry, which took place soon after, this plan fell to the ground. In the mean while his skill in anatomy and physiology had procured for him the professorial chair of the former science, which had been lately occupied by Don Martin Martinez, a man of considerable abilities.

About this period a zeal for the sciences had caused as it were a universal ferment throughout the whole peninsula of Spain. The fame of Hermann Boerhaave had drawn many of the Spanish youth from their country to Holland, for the sake of attending the lectures of that celebrated physician: these on their return brought back and diffused various branches of knowledge, perfectly new to that part of Europe, such as mathematics, botany, and many other branches of science; while at the same time the voyage

undertaken by the French academicians to Peru, to whom Don Jorge Juan and Don Antonio de Ulloa, two young Spaniards, were associated, had excited an extraordinary degree of emulation in such of their young countrymen as were desirous of placing themselves on a level with other nations in the various departments of literature and science. This epocha might almost be termed that of the revival of the sciences in Spain. Mutis, together with several of his literary friends, zealous for the honour of their country, and foremost among the promoters of knowledge, had for some time been occupied with a project of founding an academy of sciences at Madrid, when the Marquis de la Vega, being appointed viceroy of the kingdom of New Granada, solicited the subject of this memoir to accompany him to that country in the capacity of body physician. The restlessness of youth, (Mutis not being then more than twenty-six years of age,) the desire of seeing a country already rendered doubly interesting by being that fixed on for the measurement of the meridian by the French academicians, joined to the prospect of acquiring a fortune with which he might enjoy himself on his return to Spain, induced him to accept the proposal, and to embark for America with the viceroy in 1760.

Previous to his leaving Cadiz he became acquainted with the Swedish consul at that place, a man of science, who supplied him with the earliest productions of Linnæus, then already near the zenith of his celebrity, and also recommended him to enter into an epistolary correspondence with his great countryman; of which opportunity we may readily suppose that Mutis eagerly availed himself.

On his arrival at Santafé de Bogotá, the capital of the kingdom of New Granada, Mutis found that the state of science there was even more deplorable than he had supposed; fanaticism and prejudice in every shape had full and uncontrolled dominion, and a junto of dull and ignorant monks

monks disgraced the chairs of the university, from whence knowledge and light could in such a situation be alone expected to emanate. It is obvious that, under such circumstances, this new residence could be little less than a desert to an active mind like his ; but this very activity suggested a plan to him, which, should it succeed, could not fail of rendering his stay highly beneficial : he proposed to excite among the students of the university a desire for useful knowledge, to introduce sciences as yet unheard of in these regions, and thus in a manner to create a new generation congenial to his mind. Aware that this science forms the basis of most of the other branches of human knowledge, he asked permission from the viceroy to give a course of lectures on the mathematics ; which was readily granted by his patron. He accordingly began his lectures in the college del Rosario to a crowded audience ; and whether owing to the novelty of the subject, to the interesting and perspicuous manner in which he treated it, to the bent of mind of his hearers, by no means naturally averse from light, or to all these circumstances combined, mathematics soon became the favourite study of the American youth, and Mutis the object of their universal admiration. But not so with the old professors, and particularly the whole race of monks—this pest of Spain. Impatient of that light which exposed their ignorance to open view, and apprehensive that the success of Mutis would ultimately prove the death blow to their importance and influence, they rose up with a fury peculiar to themselves against the new doctrine and its professor. To bring him into discredit among the more religious part of the community, they insinuated that the science of mathematics was a magical, a divinatory, a diabolical art, unwarranted by law, and prohibited by religion ; that it was impossible for man to measure the distance of remote objects from a given point, such as the sun and moon from the earth, and

that the prediction of eclipses and other phænomena of nature could only be the result of a secret pact with the devil.

These and many other calumnies of a similar description had a limited effect, in so far as they induced many a religious person, who did not wish to be the father of a necromancer, to restrain his son from attending those profane lectures, and as they exposed Mutis to the fangs of the inquisition ; but the injury he sustained in the former case was immaterial, and from the latter he was fortunately shielded by the decided patronage of the viceroy. Thus, in spite of the machinations of his enemies, Mutis procured himself a strong party among the less prejudiced portion of the community, which entirely silenced his ignorant opponents ; and his triumph was complete, when the professorial chair of philosophy, mathematics, and natural history, finally received the sanction of the Spanish government.

We ought not to consider Mutis merely in the light of a naturalist animated with a zeal for those sciences he professes, as many of his actions and exertions have proved him to be a man who possesses a heartfelt interest in the prosperity of the country he inhabits. As such, he always (perhaps erroneously) fostered the idea that the gold- and especially the silver-mines are the principal source of the wealth, and their contents the staple commodity, of Mexico and Peru. Gold is found, in the viceroyalty of Santafé, almost exclusively in the sand of the rivers, or in the low parts of the valleys that were formerly inundated, whither this metal has obviously been washed from the sides of the mountains. The collecting of the dispersed grains of this metal requires no other talent than that of patience, and is easily performed by the natives ; but it is otherwise with the silver, the management of which, as being mineralised with other substances, and lying in regular

lar veins within the bowels of the Cordilleras, requires ingenuity, labour, and no inconsiderable expenditure of money. Mutis wished to render silver a new object of national wealth; and finding in the accounts of the first conquest of New Granada many particulars relative to the incomparable riches of some silver mines that were lost by negligence, or want of skill in the working, Mutis directed his attention to *la Montuosa* and *Vetas*, in the districts of Pampelona and Giron, the most celebrated of them. In these he laboriously employed several years with unparalleled patience, and considerable pecuniary expense: but the enterprise finally proved abortive, and the only advantage he derived from it was the acquisition of an extensive knowledge of the objects of natural history that were to be met with in those districts, and of many interesting geological facts, which, should he ever be disposed to publish them, would throw great light on the formation of the Cordilleras, and the gradual changes they have undergone in the course of ages. Here too it was that he discovered his *Psychotria emetica*, of which he sent the description to Linnæus.

The great loss which our naturalist sustained in working the mines of Montuosa, could not but render him an object of universal interest, except to persons possessed of such ungenerous minds as are incapable of sympathizing with a good man labouring under the double load of a ruined fortune and blighted expectations. The viceroy, his friend and protector, in order to furnish him with an opportunity of retrieving his losses, proposed to give him some civil employment, or the office of a magistrate; but Mutis, though in every respect qualified for either task, declined the offer, as little congenial to his inclinations*.

* The viceroy conversing with Mutis on the "*gobiernos y corrigimientos politicos*" that he intended to confer upon him, the latter replied: "*que no pensaba tener otro gobierno que el de si mismo, ni otro corrigimiento que el de sus pasiones.*"

Soon after this period Mutis embraced the clerical profession, and, having spent some months in the capital, resolved to try his fortune once more in another silver mine ; for which purpose he pitched upon that of *Sapo*, at the foot of the western ridge of mountains of the government of *Mariquita*, not far distant from the town called *Ybagué*. The spot which he chose for his ordinary residence was truly romantic. His dwelling-house stood upon an acclivity commanding the most enchanting prospects over that extensive valley, through which the river *Luisa* winds its devious course : the groves of palm-trees, and all the rural scenery in the vale below, surrounded by a chain of hills that gradually rise one above the other, till they are lost among the clouds, afford a spectacle at once pleasing and majestic. In this sequestered seat our philosopher enjoyed the benefit of a pure and salutary air, equally remote in its temperature from the two extremes of the summits of the mountains and the valley beneath. Here he divided his time between the superintendence of the mines, and inquiries into the various branches of science ; here he made his interesting observations on the natural history and economy of the ant : but botany formed the peculiar object of his indefatigable researches. Nor was he, whilst thus occupied, forgetful of the interest of others : he assisted by his medical advice not only those who lived in his immediate neighbourhood, but from many distant places people flocked to consult him ; and the success of his prescriptions was so considerable, that he was soon looked upon as the tutelary deity of the district.

His sanguine expectations respecting the mines of *Sapo* proving equally abortive with those which he had formed at *Montuosa*, Mutis now found it expedient to relinquish this object entirely. Probably it had been a collateral motive with him, by these speculations, to realise a fortune that would secure to him an independence on his return to Europe.

Europe : but this motive must now have ceased to exist, as the excellent climate of the country which he inhabited, the general esteem in which he was held by its inhabitants, the ascendancy he had acquired over their minds by his talents and virtues,—all induced him to settle for ever in the kingdom of Santafé, and, retired from the capital, and from the bustle of the world, to spend the remainder of his life in the delicious mansion of Sapo.

At the latter place he lived for several years, unknown to his countrymen in Europe, till, in the year 1778, the archbishop Don Antonio Caballero y Gorgora arrived in Santafé; an event that caused the whole body of the clergy to send in their congratulatory letters to their chief diocesan; among the number was that of Mutis; and his letter, probably as different from the rest in phrasology and sentiment as the qualifications of its writer were from those of his brethren, excited the particular attention of the archbishop, whose penetrating eye soon discovered the genius that had dictated it. Having learned the condition of the writer, he resolved to pay him a visit in person, and accordingly the next year undertook a journey to Sapo, where he only remained a few days; but this proved a time sufficient for him to be satisfied of the genius and the uncommon extent of the acquirements of Mutis, which for want of encouragement were lost to Spain and to Europe in general. It was owing to the friendship that subsisted between the archbishop and the minister for the affairs of India, that the latter learned to appreciate the merits of Mutis, and procured for him, in addition to a present of 8000 *pesos duros* for arranging his affairs, an annual pension of 2000 *pesos duros* from the king, which would enable Mutis wholly to dedicate his hours to his favourite study, that of botany. The king also conferred upon him the title of botanist and astronomer royal, and appointed him director of a botanical expedition undertaken with a
view

view of ascertaining the vegetable riches of the kingdom of New Granada. The superintendants of the botanic garden of Madrid opened a correspondence with him ; and he now almost for the first time became as well known by this intercourse to his countrymen, as he had long before been to the foreign literati by his epistolary intercourse with several celebrated naturalists, and particularly with Linnæus, who affixed his name to a plant, and caused him to be elected a member of the academies of Upsal and Stockholm.

From that period the king, and Jose de Galvez, one of his ministers, interested themselves so much in favour of the American philosopher, that the archbishop, who was appointed viceroy of Santafé in 1783, was directed to grant to him a further pension of 2000 *pesos fuertes* per annum, for the purpose of defraying the extra expenditure he might be put to as director of the expedition which was about to be undertaken : he also received orders to point out the books, instruments, and other things requisite ; which were forthwith procured from the most eminent artists in London and Paris.

Mutis having chosen for his assistants Don Eloy de Valenzuela, a very intelligent creole, and some ingenious draughtsmen, set out in 1783 on his tour through the kingdom : but owing to the zeal with which they commenced their undertaking, the health of his companion was so much impaired as to oblige him to return to Santafé, and to leave Mutis to prosecute his labours by himself ; who had now established his head quarters in the town of Mariquita. Here he dedicated a considerable portion of his time and attention to the examination of the different species of *Cinchona* which are found in that district : he succeeded in discovering, and in scientifically distinguishing, the seven species of which he communicated the description in a periodical paper of Santafé, and on which also M. Zea, his pupil, has published an interesting memoir in
the

the *Anales de Ciencias naturales*. He likewise caused to be transplanted to Mariquita, in order to examine its quality, a quantity of stems of the *Canella*, found in the woods of Andaquies, and devoted a great part of his time to the culture of the *Indigofera tinctoria*, with a view to make his countrymen more thoroughly acquainted with the commercial advantages they might derive from so useful a plant. Here he is also said to have discovered the true nutmeg, called *Otova* in the language of that country.

The deleterious climate of Mariquita, and the zeal with which he gave himself up to the object of the expedition, brought on a nervous complaint, that prevented him in a great measure from continuing to collect materials for his *Flora Bogotensis*. The king, however, being informed of this circumstance, and desirous that the indisposition of this naturalist might not deprive the world of the results of his observations, ordered him to nominate several persons who might execute, under his direction, what he was precluded from performing himself, and also to establish a botanic garden at Santafé. In pursuance of this order, Mutis repaired to the capital, where he took for his associate Don Francisco Zea, a native of the province of Antioquia, whom we have before noticed as his pupil, and also wrote to Quito for an additional number of draughtsmen. In 1791 Mutis employed twelve painters in making coloured drawings from nature, of the plants, with the necessary dissections of the flowers and fruit; a task which they are said to have executed with all that exactness and delicacy of which this branch of painting is susceptible. We understand that some time ago above 4000 drawings of this kind were finished.

In order to prevent any delay in the progress of the expedition, Mutis set about arranging his descriptions at Santafé, whilst Zea travelled in different parts to collect specimens and seeds. An unforeseen accident, however,

put

put a sudden stop to their activity : Zea, on account of an imputed conspiracy against government, was arrested in the midst of his botanical pursuits, conveyed to Santafé, and there confined in prison till 1797 ; when, with other innocent victims of that country, he was brought over to Spain to be tried : their innocence was, however, not difficult to be proved ; they were honourably acquitted, and reinstated in their former functions. Mutis availed himself of this opportunity to obtain leave from Madrid for M. Zea to undertake a journey to Paris, in order to consult the botanists of that city in various matters respecting the Flora of Bogotá, and to perfect himself in the study of Jussieu's classification of plants. This request was granted : Zea made a stay of some years in France, and, having attained his end, returned to Spain in 1801. We are ignorant whether he immediately visited his native country ; but we have recently learned that he is appointed successor to the late Cavanilles, as professor of botany and director of the botanic garden of Madrid,—an office which we have no doubt he will fill to the greatest advantage of the science.

What has been said may be sufficient as a sketch of the life of a man who, having during a long series of years extended his studies to so many branches of knowledge, has treasured up a number of observations relative to the natural and political history of New Granada, not to be acquired without a long continued application, and an ingenuity like his. As a botanist Mutis is well known throughout Europe ; and as a statesman the viceroys have made it a rule to consult him in all important and arduous undertakings ; and, what is very rare in those regions, his advice has always been in favour of the natives of the kingdom, who therefore love and respect him as one of their most active benefactors.

XXIX. *Remarks on the generic Characters of the Decandrous Papilionaceous Plants of New Holland.* By JAMES EDWARD SMITH, M.D. F.R.S. P.L.S.

THE Papilionaceous Plants of New Holland, new and strange in their whole aspect to Europæan botanists, are yet more extraordinary for having most frequently 10 distinct stamina, instead of the diadelphous or monadelphous structure usual in other countries. In this particular they agree with the genus *Sophora*; and their stamina are as uniformly distinct, separate, firm, and cylindrical or awl-shaped, as those of any plants whatever. I conceive the distinction between this kind of stamina, and the peculiarly delicate membranous united filaments of the Linnæan class *Diadelphia*, afford as essential a generic difference as any can be; for I find by observation that this structure is connected with other discriminating characters, both in the fructification and habit. Nor do I find less certainty in the particular marks of character and habit by which these genera, which have the above structure in common, differ from one another.

All botanists, however, have not been of this opinion. Of those who have had the best opportunities of knowing these plants, several have been by no means satisfied of the possibility of reducing them to order.

Not deterred by such doubts, I have always thought those departments in botany which no one has chosen to enter upon, or in which others have failed, most worthy the attention of such as have any favourable opportunities for illustrating them; and as the plants in question have particularly fallen under my observation, both in the state of dried specimens from Port Jackson, and in the gardens
about

about London, I think it my duty not to shrink from the task. Long ago, indeed, I have undertaken to define some of the genera, as *Pultencea* in the *Botany of New Holland*; *Daviesia* and *Gompholobium* in the 4th volume of the Linnean Society's Transactions; but succeeding writers having either been diffident of following up my principles, or mistaken in their own, I find it necessary to attempt an arrangement of the whole tribe.

All the genera under consideration belong to the *Decandria Monogynia* of Linnæus, and the natural order of *Leguminosæ* of Jussieu.

I. PULTENÆA. *Bot. of N. Holl.* 35.

Calyx quinquefidus, utrinque appendiculatus!

Corolla papilionacea: alis vexillo brevioribus.

Stylus subulatus.

Stigma simplex, acutum.

Legumen uniloculare, dispermium.

Of this I have 7 certain species.

1. *P. stipularis*.—*Bot. of N. Holl.* t. 12. *Willden. Sp. Pl.* vol. ii. 506. *Curt. Mag.* v. 14. t. 475.

2. *P. paleacea*.—*Willden.* 506.

3. *P. linophylla*.—*Schrad. Sert. Hannov.* 28. t. 18. *Willden.* 506.

4. *P. retusa*.

P. foliis linearibus retusis muticis glabris, stipulis geminis minutis, bracteis ovatis brevissimis.

This species grows, like the rest, at Port Jackson, and is in the English gardens.

5. *P. daphnoides*.—*Andr. Bot.* t. 98. *Willden.* 507.

6. *P. flexilis*.

P. foliis obovato-linearibus mucronulatis calycibusque glaberrimis, stipulis petiolo longioribus, floribus axillaribus terminalibusque.

I have

I have not seen this alive in England. It is a very pretty species.

7. *P. villosa*.—Willden. 507.

This is the plant I communicated to Professor Willdenow (as well as all the rest) by the name under which he has printed it. *P. villosa* of Andrews is very different.

This genus is a very natural one. The appendages to the calyx seem to me to keep it distinct from all others. These are two little leaves, situated one on each side of the body of the calyx; in some species near the top, so as to make it appear to have 7 teeth instead of 5, in others about the middle or near the base. The stipulation of the whole genus is remarkable, being *intrafoliaceous*. In the first and second species the *stipulae* are simple, or rather 2 united into one; in the rest they are in pairs. This part is no less peculiar to the genus as to situation, than excellent, according to its differences, in some cases, for characterizing the species. I cannot but wonder at my friend Willdenow's having altered my specific character of *P. stipularis* in this particular. It was certainly done without any disrespectful intention towards me; but I beg leave to observe, that a botanist who has studied a whole tribe of plants ought to be the best authority for the marks by which to characterize them, and his labours should not rashly be counteracted. The most excellent specific marks are always to be looked for in the differences of those parts, which are themselves characteristic of the habit of the genus.

It is scarcely necessary to observe, that many plants have been forced into *Pultencea* that have little to do with it. I mean not to censure those who have done so, but rather to approve of it, unless they had felt themselves competent to establish new genera on solid grounds.

2. AOTUS.

Calyx quinquefidus, simplex.

Corolla papilionacea : alis vexillo brevioribus.

Stylus filiformis.

Stigma obtusum.

Legumen uniloculare, dispermium.

X 1. *A. villosa*.

Pultenæa villosa.—*Andr. Bot. t. 309.* P. ericoides. *Venten. Jard. de la Malmaison, t. 35.*

No plant in the whole order has given me more perplexity than this. I have been desirous of keeping it in the preceding genus if possible; for I am well aware that the want of appendages to the calyx will appear to botanists in general an insufficient character; nor can I find any other mark in the fructification to distinguish it from *Pultenæa*, except some differences in the style and stigma which may be thought too trifling: Nevertheless I believe them to be founded in nature. The style of *Pultenæa* is awl-shaped, regularly ascending at all stages of its growth; with a very sharp simple stigma; in which particulars all the 4 following genera precisely agree with it. But in the plant before us the style is filiform, or rather thicker upwards, variously twisted as soon as the flower falls, and crowned with an obtuse though small stigma. Those who have studied any papilionaceous plants will be aware of the importance of such differences, though a common observer might think them too trivial for a generic distinction. Let such then be content with the simple calyx. I should not insist on either, did not the habit concur with both characters. In this plant we have nothing of the chaffy habit of *Pultenæa*. We have neither *bractææ* nor *stipulæ*, and I shall presently show the importance of the latter in defining the genera under consideration. To all this may be added, that the leaves of this plant have a great inclination to be opposite or almost whorled; and though I know

from

from experience that the situation of the leaves is not of so much weight in New Holland plants as in some others, I would not pass it unnoticed.

All these points considered, I venture to propose *Aotus* as a genus, in hope that more species may be discovered hereafter, on the immense continent to which it owes its birth, to confirm or to set it aside. Its fruit accords with *Pultenaea*, and contains 2 seeds, in which, as well as in the calyx not being at all angular, it differs from *Daviesia* and *Viminaria* hereafter to be described, not to mention the style and stigma.

3. GOMPHOLOBIUM. *Tr. of L. Soc. v. 4. 220.*

Calyx campanulatus, simplex, quinquepartitus.

Corolla papilionacea.

Stigma simplex, acutum.

Legumen ventricosum, sphaericum, uniloculare, polyspermum.

1. *G. grandiflorum*.—*Exot. Bot. t. 3.*

2. *G. latifolium*.

G. foliis ternatis obovato-oblongis planis venosis, ramulis angulatis glabris, carinâ fimbriatâ.

3. *G. minus*.

G. foliolis ternatis linearibus aduncis, ramulis teretibus hirtis, carinâ nudâ.

4. *G. pinnatum*.

G. foliis impari-pinnatis multijugis, caule tereti flexuoso glabro.

The deep-divided calyx and globose pod with many seeds, well characterize the fructification of this genus, as the compound leaves, and a certain aspect of rigidity and smoothness, mark its habit; to which may be added that the *stipulae* are not intrafoliaceous, but stand on each side of the base of the common footstalk. They are a pair of

acute flat close-pressed leaves, extremely minute and often altogether wanting.

4. CHORIZEMA. *Labillardière.*

Calyx quinquefidus, bilabiatus.

Corolla papilionacea.

Stigma simplex, acutum.

Legumen oblongum, ventricosum, uniloculare, polyspermum.

1. *C. ilicifolium*.—*Labillardière Voyage, tome i. p. 405. pl. 21.*

X 2. *C. trilobum*.

Pultenaea ilicifolia. *Andr. Bot. t. 320.*

3. *C. scandens*.

C. foliis suboppositis ellipticis indivisis, pedunculis racemosis terminalibus.

This genus has simple veiny leaves, spinous at their terminations; but its most remarkable character consists in the stipulæ which project in the form of little rigid spines, making a right angle with the stem, and are sometimes even, recurved. As to the fructification it comes nearest to *Gompholobium*, but the tubular 2-lipped calyx, and the rather oblong than globular pod are sufficient, the very different habit being considered, to separate it.

5. DAVIESIA. *Tr. of L. Soc. v. 4. 220.*

Calyx angulatus, simplex, quinquefidus.

Corolla papilionacea.

Stigma simplex, acutum.

Legumen compressum, monospermum.

1. *D. acicularis*.

D. foliis linearibus revolutis pungentibus strictis denticulato-scabris, floribus axillaribus solitariis.

2. *D. ulicina*.—*Donn. Cat. 76.*

D. ulicifolia. *Andr. Bot. t. 304.*

.. *Ulcina*

Ulicina (not *ulicifolia*, which is neither expressive nor correct,) is my original name. The gardeners had corrupted it before it came to Mr. Andrews.

3. *D. umbellulata.* ✕

D. foliis lanceolatis planis pungentibus lævibus, pedunculis axillaribus umbellatis subquadrifloris, calyce truncato.

4. *D. corymbosa.*

D. foliis lineari-oblongis planis, pedunculis axillaribus corymbosis multifloris, calyce regulari.

✕ 5. *D. squarrosa.*

D. foliis cordatis pungentibus reflexis margine scabris, floribus axillaribus subgeminis.

Simple spinous leaves, rigidity of habit, and in general a freedom from all hairiness, mark this genus. *Stipulae*, as far as I can perceive, are entirely wanting. A great peculiarity in the colour of the flowers is observable. When fresh they are yellow, more or less variegated with crimson or purple; but in the dried state the yellow part invariably becomes whitish, which is not the case in any other plant of this tribe. In the generic character the angular calyx without appendages, and the compressed single-seeded pod, keep it clearly distinct from *Pultenaea* and *Lotus*, the only genera already described with which it has in other respects any agreement. How different they are in habit it is needless to repeat.

6. *VIMINARIA.*

Calyx angulatus, simplex, quinquefidus.

Corolla papilionacea.

Stigma simplex, acutum.

Legumen coriaceum, farctum, univalve, non dehiscens, monospermum.

1. *V. denudata.*

Daviesia denudata. *Ventenat Pl. Select. t. 6.*

Sophora juncea. Schrad. Sert. Hannov. 9. t. 3.

Pultenæa juncea. Willden. Sp. Pl. v. 2. 506. Donn. Cat. 76.

This genus has been long established in my mind. Nevertheless when I found it reduced to *Daviesia* by M. Ventenat, I was at first much struck with the propriety of such an arrangement, and could not but applaud the sagacity of this most excellent botanist, who had no other guide than my short character of *Daviesia* in the *Tr. of Linn. Soc.* A re-examination of the fruit, however, which M. Ventenat had not an opportunity of comparing with that of *Daviesia*, has fixed me in my former opinion. The pod of *Viminaria* is most extraordinary in its nature. I have not seen it fresh, any more than M. Ventenat, but it appears to be of one piece, leathery or succulent in texture, bursting on one side only, and that not spontaneously, its cavity entirely filled by one large kidney-shaped seed. It is closely allied to the pod of *Trifolium*! The pod of *Daviesia* on the contrary is very hard and horny, of 2 flat elastic valves, with a cavity extending greatly beyond the dimensions of the seed. When to this we add the great peculiarity of habit in *Viminaria*; its rushy paniced leafless stem; the few leaves (one of which is ternate) which exist only in the infancy of the plant; the presence of stipulæ to those leaves; and, finally, the permanency of the yellow in its flowers when dried, I think the genus cannot be controverted.

To *Pultenæa* or *Sophora* it has neither affinity nor resemblance.

To M. Ventenat's remark, that "it is probable the characters of these papilionaceous genera of the South Sea Islands may be reformed when more have been observed," I trust this whole paper will afford a satisfactory reply. That "several of them appear to differ from *Aspalathus* and *Spartium*, only in having distinct stamina," is very true till they are carefully studied, and then I am confident other characters

acters will be always found to confirm that of the stamina. The present genus has most resemblance to some naked species of *Spartium*, but how different are the fruit and angular calyx, not to mention the stamina! In the vast genus of *Aspalathus* I can find nothing, on a cursory survey, which has any peculiar resemblance to these New Holland plants, except *A. spinosa*, which in calyx and pod greatly resembles a *Daviesia*. Its style however is not that of a *Daviesia*, but belongs rather to a genus hereafter to be described, *Dillwynia*. Neither is the habit, when critically observed, like any thing now under my consideration, but much more resembles that of its congeners. If it were otherwise, this *Aspalathus* must become a *Daviesia*, for it is not one of the original species of its own genus.

7. SPHÆROLOBIUM.

Calyx quinquefidus, irregularis.

Corolla papilionacea.

Stigma carinatum, membranaceo-dilatatum!

Legumen pedicellatum, turgidum, obliquum, monospermum.

Stamina duo suprema distantia!

1. *S. vimineum*. ✕

The only species of *Sphærolobium* which has fallen in my way, has the rushy, naked, panicked stem of the last genus. In dried specimens, and I have seen no other, no traces of leaves or footstalks are discernible; but it is highly probable the seedling plants may have leaves. The flowers are numerous, racemose, small, deep yellow, abounding in marks of generic distinction, as expressed above. All the foregoing genera, except *Aotus*, agree together precisely in their awl-shaped ascending style, and simple sharp stigma; but in this the style is most singularly contorted, and the stigma lateral and membranous, approaching to those of *Pisum*, *Lathyrus*, &c. The little pod, which stands on a long stalk, and is not quite round, but rather

broader than long, and obliquely twisted, is very peculiar. No doubt can arise as to the certainty of this genus.

8, DILLWYNIA.

Calyx simplex, quinquefidus, bilabiatus.

Corolla papilionacea.

Stylus reflexus.

Stigma obtusum, pubescens!

Legumen ventricosum, uniloculare, dispermum.

* 1. *D. ericifolia*.

D. foliis punctulato-scabris, floribus subterminalibus.

λ 2. *D. floribunda*.

D. foliis tuberculato-scabris, floribus lateralibus axillaribus.

✓ 3. *D. glaberrima*.

D. foliis lævibus, floribus terminalibus subcapitatis.

With this genus, though long known in the green-houses about London, no person has ventured to meddle. It has even escaped being huddled into *Pultenæa*. I am happy to name it in honour of my friend Mr. Lewis Weston Dillwyn, F.L.S., whose scientific labours respecting the genus *Conserua*, as well as his knowledge in other abstruse parts of botany, merit such a memorial.

The essential character depends more particularly on the style and stigma, which are both widely different from those of all the foregoing, the style being short, bent backwards at an obtuse angle, and the stigma blunt (almost capitate), and downy. The *vexillum* is remarkably short and broad; the pod most like that of *Pultenæa* containing in general 2 seeds; but the calyx has no appendages, its 2 upper segments are larger than the rest, and strongly divaricated. Towards the base it is angular.

In habit the three species closely agree, and differ from all the rest of their tribe. Their leaves are simple, linear, thick set, like those of an *Erica* or *Diosma*, and without any

any stipulae. The flowers are yellow, and retain their colour when dried.

9. MIRBELIA.

Calyx simplex, quinquefidus, bilabiatus.

Corolla papilionacea.

Stylus reflexus.

Stigma capitatum.

Legumen ventricosum, biloculare! dispersum.

X 1. *M. reticulata*,

Pultenaea rubicæfolia. Andr. Bot. t. 351.

Of all the tribe this genus is one of the most distinct. Its pod is like that of an *Astragalus*, heart-shaped and turgid, divided into 2 cells by a double membranous partition, each cell containing one seed. The very short, conical, strongly reflexed style, and the capitate stigma, contribute to strengthen the character. The habit is no less peculiar. The leaves and branches are opposite, or often 3 together, and the flowers are of a purplish blue, instead of being yellow like all the preceding. The leaves are elegantly reticulated with transverse veins, as if stitched with thread. This has made me prefer the specific name *reticulata* to *rubicæfolia*, as the leaves give me no idea of any *Rubia*, and especially as I have dedicated this genus to M. Mirbel, whose elucidations of the *reticulated structure* of vegetables, as well as his whole work on the subject of their physiology, must render his name dear to every philosophical botanist.

The above arrangement contains every species of Papilionaceous plants of New Holland, with separate stamina, that have come under my observation, except one. This has the much-branched, panicled, angular, leafless stem of a *Spartium*; numerous yellow flowers in scattered short clusters; a deeply divided calyx, somewhat like *Gompholobium*; an obtuse stigma, and, I think, a many-seeded germen.

germen. I perceive but little analogy of habit or structure with any genus hitherto described, but without the fruit I dare not determine it as a new one.

If any correct and philosophical botanist should take the trouble to follow me through the above detail, he will surely be confirmed in those two most invaluable maxims of Linnæus, which cannot be too often repeated, and the true understanding of which forms (I would almost say) the *essential character* of a true systematic botanist, that "*the genus should indicate the character, not the character the genus,*" and that "*all genera,*" if well understood, "*are natural,*" even in a subdivision of a most natural order; of which I conceive there cannot be a more beautiful or satisfactory example, than the tribe which I have endeavoured to illustrate. Some future observer, richer in materials, will I hope bring it hereafter to a higher point of perfection.

Norwich,

Nov. 14, 1804.

XXX. *Description of Bauera rubiæfolia*, by R. A. SALISBURY, Esq. F. R. S. &c.

THIS beautiful genus was first discovered in New Holland by Sir Joseph Banks, who has since named it in honour of two famous botanical painters, natives of Germany, Francis and Ferdinand Bauer. The works of the older of these brothers are indeed most admirable, far excelling all that have appeared before, and hardly to be rivalled in future ages. Two good figures of this shrub are already published, but without any very accurate character of the genus, which no botanist yet seems to have understood: for certainly it has no affinity to *Rubus*, as the author of the description in the Botanical Repository supposes; and even

even still less to *Rubia*, though there is a *primâ facie* resemblance in the foliage.

I believe its real place in the great chain of vegetables is among the Saxifragæ of Jussieu, in which it will form a separate section of *stamina numero indefinita*. With regard to the insertion of the petals and stamina in this natural order, if the flower is carefully dissected, they will be found placed in the rim of the receptacle, which in *Bauera* surrounds the base of the pericarpium; indubitably never in the calyx, what has hitherto been so called being strictly either a part of the pericarpium, or the receptacle itself. The embryo in this genus may be most distinctly seen in seeds that are not quite ripe, when it is of a bright green colour, and easily slips out of the albumen.

The great Linné, in naming plants after celebrated men, has often traced with much ingenuity some resemblance between their manners and habits, and those of the vegetable. Thus the stem of *Bauera*, firm and inflexible, pushes rapidly forward, in spite of every obstacle, into full flower and fruit, like the transcendant pencil of those painters whose name it bears: stipules or bractes it has none, disdaining as it were these vulgar supports in arriving at perfection: moreover, almost every part is produced in pairs; the cotyledons in pairs, the branches in pairs, the leaves in pairs, the flowers in pairs, the styles in pairs, and, lastly, the cells of the fruit in pairs.

This evergreen shrub is easily cultivated, bearing moderate frost in the open air without injury: it ripened seeds abundantly at Mill Hill last summer, and may also be propagated by cuttings. Like most of the plants we have yet received from Port Jackson, it requires abundance of water, and when in the greenhouse cannot be treated too hardily.

BAUERA.

BAUERA.

Ordo naturalis.—SAXIFRAGÆ Juss. sectione propriâ, staminibus numero indefinitis.

Character generis.

Cal. 7—9-phyllus, persistens. *Pet.* 7—9, decidua. *Stam.* plurima. *Per.* fere totum superum, inflato-capsulare. Calceolaria! sed rigidum, 2-loculare, ab apice dehiscens. *Styl.* 2, caudati. *Stigm.* subglobosum. *Sem.* plura, oblonga, lineâ umbilicali elevatâ. *Frutex* strictus, lignosus. *Folia* opposita, ternata, semper virentia. *Flores* in axillis foliorum solitarii. *Stipulae* vel bracteae nullae,

B. rubiæfolia foliis ternatis, lineari-lanceolatis, dentatis.

B. rubioides. Sims in Bot. Mag. n. 715. cum Ic. — *B. rubioides.* Kenn. in Bot. Rep. n. 198. cum Ic.

Sponte nascentem juxta Botany Bay, legit Jos. Banks.

Floret apud nos, ab Aprili in Novembrem.

Frutex 10 pedes altus. *Radix* fusca, stipitiformis ramis valde decompositis ultimis tenuissime fibrosis. *Caulis* tenellus ruber, mox fuscus, crassitie calami, strictus, teres, sub petiolis prominulus: *Rami* oppositi ternive, densi, recti, patentissimi; in nostris quadrimis exemplaribus nondum rimosus, hirtus, rigidus, lignosus. *Folia* opposita ternave, densiuscula, ternata; *Petiolis* pallide virides, vix $\frac{1}{2}$ lineæ longi, erecti, semiteretes, glabri: *Laminae* recurvo-horizontales, media 3—7 lineas longa, laterales breviores et parum inæquilaterales, lineari-lanceolatae, dentatae, apice dentibusque pallo fusco minuto obtuso mucronulatae, supra virides cum rubore aliquo præcipue tenellæ, subtus pallide virides; præter, pilos raros per nervos subtus glabrae; crassiusculæ, rugosulae: *Nervi* tenues, supra nec subtus magis conspicui ut in plerisque Saxifragis, 2-ennia.

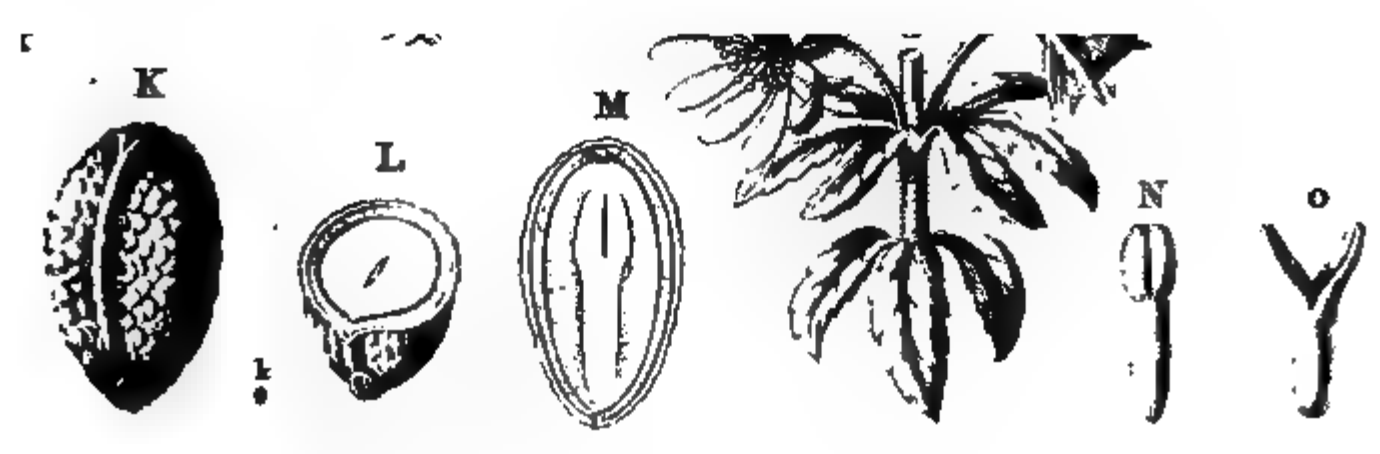
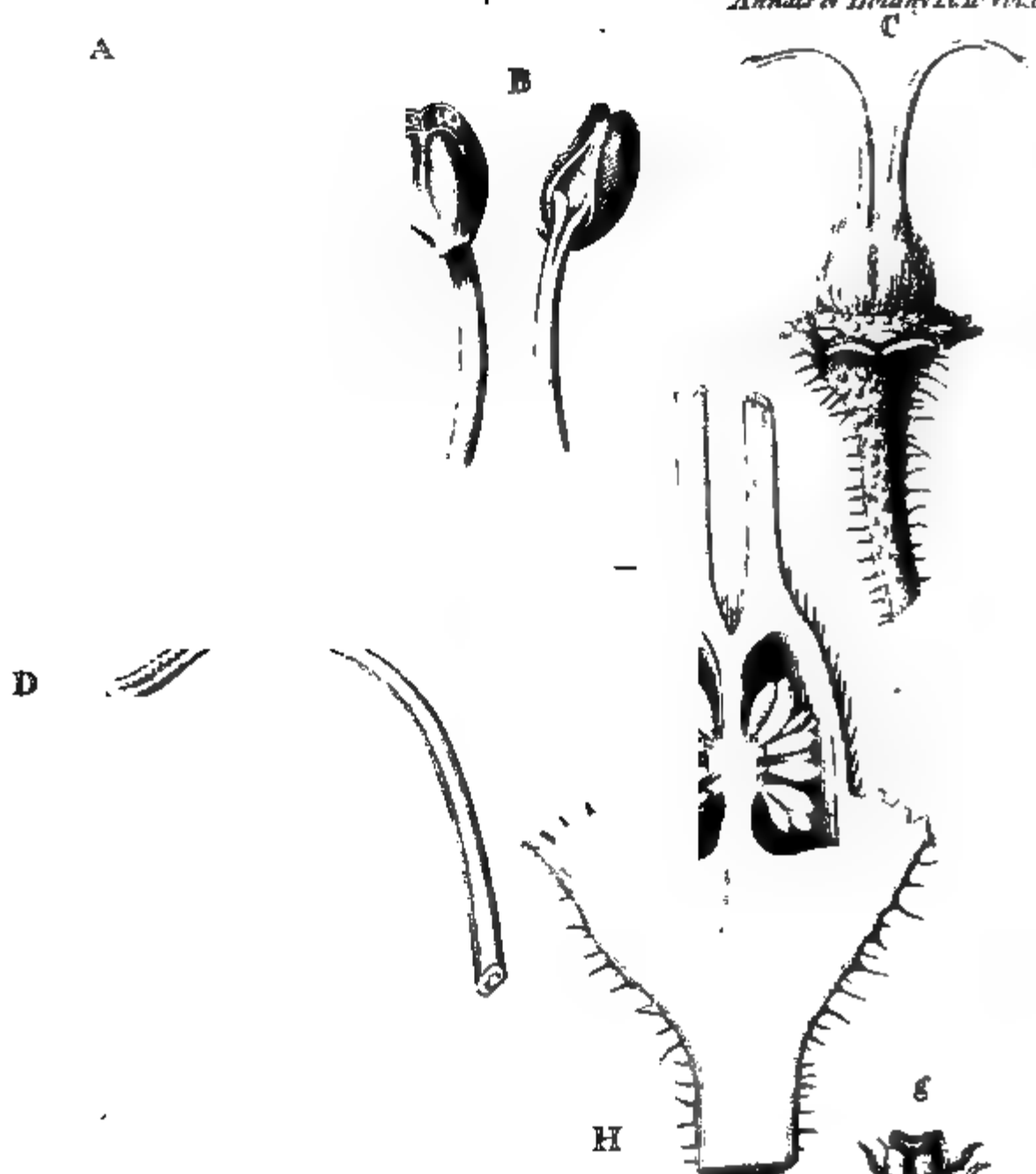
Flores

Flæres inodori, nonnihil penduli. *Pedunculæ* rubri, e pluribus axillis foliorum superiorum solitarii, graciles, foliis parum longiores, patenti-recurvi, teretes, versus apicem crassiores, hirti. *Torus* ruber, basin pericarpii vestiens, medioliformis, extus scabriusculus et hirtus. *Calyx* ruber, margine tori insertus, circiter 2 lineas longus, recurvus, 7—9-phyllus, persistens: *Foliola* structura foliorum, sed extus scabriuscula et hirta. *Petala* 7—9, rosea, margine tori proxime intra calycem inserta, ligulari-spatulata, repandula, obtusa, lævia, concava, tenuissime nervosa, decidua. *Filamenta* 50—60, alba, apice tori circulo angusto dilatato inserta, petalis breviora, patentia, capillaria, lævia. *Antheræ* flavæ, parum supra basin dorsi insertæ, suborbiculari-reniformes, 2-loculares, 4-valves: Valvæ ab apice rimâ angustâ dehiscentes, concavæ: post anthesin vix minores nec figurâ mutatæ. *Pollen* pallide flavum, minutissimum. *Pericarpium* basi toro immersum, dein superum: casum pallide viride, circiter 1 lineam longum, late pyramidale, compressiusculum, emarginatum, pilosum: gravidum lætè viride, 2 lineas longum, inflato-capsulare, rigidum, 2-loculare, rarissime 3-loculare, 2-valve, 2-acuminulatum: Septum valvis contrarium. *Colum* (id est, receptaculum seminum) medio septi utrinque adnatum, orbiculare, tuberculatum: parturiens pallide fuscum, valvis ab apice una cum parte septi dehiscentibus, colo centro relicto. *Styli* 2, albi, graciles, filamentis longiores, recurvo-patentes, caudati, teretes canaliculo angustissimo per latus superius, læves. *Stigma* album, subglobosum, exquisite papillosum. *Semina* 15—20 in singulis loculis, fusca, sessilia, $\frac{1}{2}$ lineam longa, oblonga lineâ umbilicali testam percurrente elevatâ, minutissime tuberculata. *Embryo* viridis, medio albuminis quo $\frac{1}{2}$ brevior, rectus; *Cotyledones* oblongæ, radícula breviores: sub pericarpii dehiscentiâ decidua.

Exemplar præbet tyronibus utile et facile intellectu hic frutex folii *ternati*, petiolis omnibus scilicet longitudine et situ convenientibus: quæ apud plerosque auctores folia *ternata* audiunt, potius sunt *binata* cum impari.

Explanation of Plate X.

- a. The flowers of *Bauera rubiæfolia*, natural size.
- A. The same with its petals cut off, magnified.
- B. Part of the stamens with their anthers, highly magnified.
- C. The germen and styles, magnified to the same degree as A.
- D. Transversal section of the germen, just above the torus or receptacle, more magnified.
- E. Longitudinal section of the same, magnified the same degree.
- F. Part of the style with the stigma, magnified the same degree.
- g. The capsule, natural size.
- G. The capsule, magnified the same degree as A and C.
- H. Longitudinal section of the same.
- I. Transversal section of the same.
- k. A seed in its natural size.
- K. The same, highly magnified.
- L. Transversal section of the same.
- M. Longitudinal section of the same.
- N. The embryo separated.
- O. The same with its cotyledons opened.



XXXI. *Remarks upon some Parts of the Hedwigian System of Mosses, with a Monograph of the Genus Bartramia.*
By DAWSON TURNER, Esq. F.R.S. &c.

THE arrangement of Mosses, first suggested by Professor Hedwig, is now so well understood, and so generally adopted, by all European botanists, that there can be little necessity to explain its principles, or to point out its superior advantages over those which had been previously proposed. It has happened, however, with this, as has been the case with most other favourite innovations upon their first introduction, that its earliest converts, adhering too rigidly to the theory they had laid down, have not attended with sufficient care to the associations pointed out by nature; but in some instances by uniting, in many by disjoining, have thrown a considerable degree of perplexity over a system in itself beautiful, natural, and simple. To this system the principal, and in my opinion the only objection that cannot easily be obviated, has always been, that it was founded on parts too inconspicuous to be easily examined; that its distinctions consequently were too minute; and that, occasionally requiring the use of high magnifiers, it was ill adapted for general use. In many instances I am ready to allow the full force of this objection, and no botanist more earnestly wishes that it were possible entirely to remedy it. The complaint, however, if fairly weighed, goes rather against the study of mosses in general, than against any particular arrangement; for, among individuals themselves so small, it necessarily follows, that the parts connected with the fructification, on which alone generic distinctions can properly be founded, must be often exceedingly minute; nor is the peristomium of a moss by any means comparatively less than the seed-vessels of phænogamous vegetables.

Could

Could a new arrangement be constructed upon the various forms or inclination of the capsules, every naturalist would have reason to rejoice : but the slightest acquaintance with the subject evidently points out the impossibility of such an attempt ; and it therefore only remains for us to obviate, as far as lies in our power, the inconveniences of that which we at present employ.

The necessity of attending to a very sound Linnæan precept, that “ Genus dabit characterem, non character genus,” has lately* been urged with peculiar force, and applied to this subject, by the president of the Linnean Society ; and the further pursuing of this principle in connection with the mosses, is one of the leading objects that I have now in view ; for it appears to me that there is no so effectual method of removing the objection above mentioned, as by endeavouring to comprise under our genera plants so naturally connected that the student on the first view of a species may be enabled to form a probable conjecture as to the genus to which it belongs. I am aware that a different opinion has been maintained by many writers, and particularly by Professor Willdenow† : but in a case like this, where personal experience is alone the true test for deciding, and where, consequently, every naturalist who will but observe has equal opportunity of judging, I must take the liberty of dissenting from any authority, however respectable, if in opposition to what I have myself remarked.

I have already‡ more than once had occasion to observe, that I cannot consider the form and situation of the male flowers, or the minute differences of the interior peristomium, as sufficient or convenient marks for generic distinctions ; and those who agree with me on these points, will

* Linnean Transactions, vii. p. 258.

† Schraders Journal für die Botanik, ii. p. 1 et seq.

‡ Muscologia Hibernica Spicilegium, passim.

find they have already removed the greater part of the difficulty attending the investigation of the Hedwigian system; from the minuteness of the parts to be examined.

With regard to the male flowers, whether gemmiform, capituliform, or disciform, Dr. Hedwig* himself readily allowed it to be a matter of inferior moment, and observed that he had recourse to it in the construction of his genera, merely under the idea that by increasing their number he prevented the probability of any one being overloaded with too great a quantity of species. Their monoecious or dioecious disposition he considered as more important; nor am I by any means inclined to dispute the propriety of many of the genera founded upon this principle; but I can by no means accede to them all, and I am greatly mistaken if a more simple, obvious, and natural mark is not afforded by the axillary or terminal situation of the female flowers; which circumstance alone I would admit, together with the differences of the peristomium, in establishing the families of mosses.

The male flowers are always minute, generally inconspicuous, and rarely to be observed at the time when the capsule is mature; besides which, their being not unfrequently on distinct individuals, tends not a little to increase the difficulty of investigating through their medium. They tend also not unfrequently to perplex and mislead the student, by causing unnatural associations, or disjoining plants naturally connected; as when, contrary to all reason, *Barbula* is torn from *Tortula*, and *Webera* from *Bryum*; *Mnium marchicum* and *sphaerocarpum* kept apart from *Bartramia pomiformis*; and *Fissidens* separated from *Dicranum*,

* "Ist es aber übrigens den Herren Botanikern, um der Schwierigkeit willen, die ihnen die Aufsuchung der männlichen Blumen macht, beliebig, in Zukunft, wie Schreber, *Tortula* mit *Barbula*, und *Fissidens* mit *Dicranum* zu verbinden: so kann ich mir dieses leicht gefallen lassen." Hedwig in *Usteris Annalen der Botanik*, 3rd No. p. 49.

to receive plants with so little affinity to each other as *D. bryoides* and *strumiferum*.

It is not indeed to be denied that the charge of minuteness applies also to the female flowers, and that the shooting out of new branches makes the situation of those which are really terminal apparently lateral. This latter, however, may in most instances be detected; especially if the plant be examined before the capsule is fully ripe: nor is the former by any means so strong an objection as Dr. Hedwig seems to consider it; for few naturalists would think of examining a moss before the appearance of the pedicellus; and as soon as this is visible, the difficulty vanishes. The minute variations of the inner peristomium tend also, in my opinion, by no means to facilitate the study of the Musci: the genera* founded on this principle are *Bartramia*, *Meesia*, *Timmia*, *Pohlia*, and *Leskea*. Upon the first of these I shall in the course of this paper have occasion to speak more at large; the three following ones I would by all means incorporate with the *Brya*, to which they appear to me bound by every tie; and the last I would equally join with the *Hypna*, though the number of these is already so considerable, that any subdivision of them, upon sound and obvious principles, would be highly desirable.

It will immediately be seen that the alterations now suggested are not widely different from those adopted by the President von Schreber or Dr. Swartz†, and are precisely similar to what has been followed in the *Flora Britannica* and *Muscologiæ Hibernicæ Spicilegium*. I would, how-

* If this were strictly attended to, *Meesia longiseta* ought also to form a distinct genus, as it was considered by Professor Willdenow, and by Dr. Mohr, in his and Dr. Weber's most useful catalogue of their cryptogamic herbarium.

† Both these botanists have united *Gymnostomum* and *Anictangium*, separated *Didymodon* and *Trichostomum*, and kept *Meesia*, *Timmia*, and *Pohlia* distinct from *Bryum*.

ever, wish to carry the matter a little further than has been done in that work, and at the same time to correct an opinion I then entertained relative to the genus *Mnium*, about which I now feel altogether disposed to coincide with my friend, Dr. Smith, that it ought to be separated from *Bryum*, and that the capsule naturally and constantly sulcated, affords a good character as well for this as for *Bartramia*, the plants comprised under both which are as closely connected by nature as those of any other tribe, not excepting even the *Phasoa*.

It has always been a favourite idea with me, that every set of mosses with the same conformation of their peristomium comprehended two distinct genera; the one with female flowers terminal, the other lateral; thus *Gymnostomum* and *Anictangium*, *Grimmia* and *Pterogonium*, *Bryum* and *Hypnum*, stand in this relation to each other; and could this but be carried through the system, how beautifully simple, and yet complete, would it appear! I am indeed fully aware that very much must be added to our knowledge by future observation and discovery, before we arrive at so pleasing an end, and that what we at present know affords but slender hopes of our ever doing so; but still it seems desirable to extend the idea as far as can be done consistently with truth and nature. On this account I would by no means consent to the union of *Gymnostomum* and *Anictangium*, two genera with little or no affinity, except what is afforded by the naked orifice; and I exceedingly wish that two or three species did not stand in the way to prevent our separating from *Dicranum* the *hypniform Fissidentes**; for such as by their appearance naturally belong to that genus, as *F. strumifer*, *polycarpus*, &c. would from the terminal situation of their female flowers

* By this expression it is meant to denote those species which, according to the Linnæan system, would have been ranged with the *Hypna*, as *H. acrifolium*, &c. &c. &c.

still be allowed to remain there. *Encalypta* I really think must be united with *Grimmia*, as it now stands, and would serve as a further bond of union between the Hedwigian *Grimmiæ* and *Weissiæ*, agreeing with the latter in general habit, and in the narrow teeth of the peristomium, but with many of the former in that striking peculiarity the large, loose, campanulate calyptra.

The genus *Orthotrichum* is in every respect the *Cruz* of the muscologist: its species resemble each other so closely, and vary so much in appearance, that they are no less perplexing than the *Tortulæ*; its female flowers, contrary to all analogy from its habit, are constantly terminal; its male ones both axillary and terminal; and the peristomium in some instances single, in others double; so that, if attention be paid to this point alone in the formation of our genera, it will be necessary to adopt the proposal of Professor Willdenow, and carry *Orthotrichum anomalum* to the *Grimmiæ*. So violent a separation few botanists, perhaps, will be inclined to approve; and I should therefore propose here also to call in the aid of Dr. Smith's character of *Mnium*, and admit the sulcated capsule as an essential part of the generic distinction; by doing which the true* *Orthotricha* will be kept distinct, and all danger of confounding them with any of the surrounding genera will be at once removed more effectually than by attending to the campanulate sulcated calyptra, which they have in common with *Grimmia cribrosa*, *Donniana*, and *Daviesii*, as well as some *Hypna*, and some other mosses.

• The genus *Bartramia*†, the more immediate object of my

* It will in this case only be necessary to separate from the genus the *Orthotrichum Brownianum* of the Flora Britannica, respecting which I cannot but differ from the learned author of that work, and consider that on every account it belongs to the *Grimmia*; though Dr. Smith, on account of the sulcated calyptra, was induced to place it with the *Orthotricha*.

† The name of this genus was given in honour of the memory of Bartram, a Pennsylvanian

my present inquiry, was first described by Hedwig, in the 8d vol. of his *Stirpes Cryptogamicæ*, p. 111, with the following character :

“ *Peristoma duplex. Externum* dentes sedecim cuneiformes ; *internum* membrana conica plicato-carinata, in aperturam lacinulatam connivens. *Flos* androgynus.”

From this definition it is sufficiently apparent that the two essential marks, by which it was proposed to preserve the *Bartramia* distinct from the *Brya* and *Mnia*, were the irregular divisions of the interior peristomium, and the androgynous situation of the flowers. Upon the latter of these Dr. Olof Swartz has with great justice remarked that it is common also to *Mnium crudum*, and *Pseudo-triquestrum*, which, nevertheless, it was not thought necessary on that account to remove from their situation ; and with regard to the former, the same able botanist has observed that the inner peristomium is a carinated membrane, divided into sixteen semibifid teeth, with no intervening cilia. He has therefore proposed the following* amended character, by which he purposed to include *Bryum marchicum*, *fontanum*, and *sphaericarpon*, three species which ought unquestionably to be arranged under *Bartramia*, though Hedwig himself so blindly followed his own theory, that, although in the plate immediately preceding *B. Halleriana* he had figured his *Mnium marchicum*, yet from the circumstance of the flowers being androgynous in the one, and dioicous in the other, he did not think it necessary to take the slightest notice of their affinity.

“ *Capsula* subrotunda ; *peristomium* duplex, *exterius* dentibus 16 apice inflexilibus, *interius* e membrana carinata 16-partita, lacinulis bifidis.”

a Pennsylvanian colonist, who there gathered various cryptogamous plants for Dillenius. The plant first referred to it was the *Bryum laterale* of Hudson, called by Hedwig after Haller, who first discovered it.

* Schraders Journal für die Botanik iv. p. 181.

This definition is almost verbatim copied in the *Muscologiae Hibernicae Spicilegium*, nor does it essentially differ from that in the *Flora Britannica*; and the only alteration I now wish to propose, is by advising the botanical student to pay particular attention to the spherical sulcated capsule, rather than to the differences of the interior peristomium; for upon these * implicit reliance is not to be placed, and I have lately been more than ever convinced by my own experience of the impossibility of investigating entirely by their means. They are too minute, too delicate, and too inconspicuous for general use, though in particular cases, and in the determination of difficult points, they may certainly be resorted to with great advantage. I have already remarked, that the species included under *Bartramia* are very naturally connected, and such as no botanist can have a difficulty in referring to their proper place in the system. Besides their spherical sulcated capsule, they have something in their habit entirely their own; their mode of growth, and the form, colour, and texture of their leaves, are essentially different from those of all the other tribes of mosses with a double peristomium, and seem more nearly connected with some of the *Dicrana*. The species indeed of this genus are by no means numerous, but interesting from their beauty and singularity; and it now only remains for me to give a catalogue of such as have already fallen under my observation; in doing which I shall offer descriptions of those only of which I am not aware that any satisfactory account has previously been published.

Pedicellis caulem superantibus.

1. *Bartramia fontana*, caule ramoso; ramis fasciculatis

* Dr. Smith, for instance, makes it a part of the generic character, that the inner peristomium is *variè laciniatum*; Dr. Hedwig simply says of it *apice lacunculatum*; and Dr. Swartz allows that, in *B. fontana* and *Halleriana*, *apice interdum inordinatè finditur*.

subsimplicibus

subsimplicibus teretibus; foliis ovatis acuminatis apice serrulatis appressis. *Fl. Brit.* p. 1342. *Musc. Hib.* p. 107.

B. pumila.—*Musc. Hib.* p. 107. t. 10. f. 1.

2. *Bartramia marchica*, caule ramoso; ramis fasciculatis subsimplicibus teretiusculis; foliis lanceolatis acuminatis integerrimis erecto-patulis. *Hedw. Stirp. Crypt. ii.* t. 39. p. 108.

Mnium marchicum.—*Hedw.*

This plant was first discovered near Spandan by Professor Willdenow, and by him communicated to Hedwig: its resemblance to the preceding species is very great; but it may be easily known from that by its much smaller size, its shorter branches, their less cylindrical appearance, and the different form and entire margins of its leaves. I am not aware that it has since been found by any other botanist.

3. *Bartramia sphaerocarpa*, caule ramoso; ramis fasciculatis subsimplicibus teretibus; foliis lanceolato-subulatis serrulatis appressis. *Hedw. St. Crypt. iii.* t. 38. A.

Mnium sphaericarpon.—*Swartz Prod.* p. 189. *Hedw.*

A native of Jamaica, where it was first detected by Dr. Swartz, and described in his Prodrömus of West Indian plants above quoted. Hedwig justly observed, it so nearly resembled *B. marchica*, that it might easily be mistaken for a small variety of it, but that it differed essentially in the margin and lower surface of its leaves. There appears to me, from the specimen I have received of both, to be a still greater difference in the branches of *B. sphaerocarpa* being longer and more cylindrical, and the leaves more narrow and appressed. It is not, however, to be denied that the use of the microscope is necessary often to distinguish them.

4. *Bartramia Menziesii*, caule elongato dichotomo tereti;

foliis lanceolato-subulatis integerrimis appressis pedicellis caulem subæquantibus. *Tab. 11. f. 1.*

Caules tripollicares, et ultra, graciles, teretes, bis ter dichotomi, ramis subfastigiatis; folia flavo-viridia, inferiora fuscèscencia, a basi anguste lanceolata longe subulata, arcte imbricata, margine integerrima, tantillum involuta, nervo valido concolore percursa, modice carinata, concaviuscula, siccitate æque atque madore appressa, et stricta; pedicelli laterales, sesquiunguiculares, purpurascens, læves, caulem vix superantes; capsulæ luteo-fuscae, sphaericæ, sulcatæ, erectæ; operculum non vidi.

This species was brought from the north-west coast of America by Mr. Menzies, after whom I have named it. I can find no description of it in any author, and from its long cylindrical branches and dichotomous mode of growth, there can be no fear of its being confounded with any other of the genus.

5. *B. Oederiana*, caule elongato subdiviso; ramis vagis; foliis lanceolatis acutis serrulatis reflexo-patulis. *Fl. Dan. t. 478. Swartz in Schrad. Journ. iv. p. 180.*

B. gracilis.—*Fl. Brit. p. 1341. Flörke in Schrad. Journ. ii. p. 171.*

Bryum Oederi.—*Retz. Prod. n. 1391.*

Caules subbipollicares, vage divisi, inferne fusco tomento obducti; folia lutescentia, remotiuscula, late lanceolata, acuta, neutiquam acuminata, reflexo-patula, per totam longitudinem argute serrulata, nervo valido, dilute fusco percursa, insigniter carinata, siccitate raro subcrispata; pedicelli pollicares, terminales, e flavo purpurei, nitidi, erecti, læves; capsulæ sphaericæ, fuscae, tantillum obliquatæ, sulcatæ; operculum convexum, rutilans.

The reflexed, widely lanceolate leaves, less setaceous than in any other of the genus, sufficiently distinguish this plant from all its congeners. It appears to have been first published

lished by Oeder in the Flora Danica, as above quoted, about the year 1770, but without a name. Retzius afterwards described it as *Bryum Oederi* in the Prod. Flor. Scand., and Mr. Flörke gave a specific character of it as a new species under the title of *B. gracilis* in Mr. Schrader's journal. Dr. Smith has a specimen of it in his Herbarium, gathered by Mr. Dickson in Scotland.

6. *B. pomiformis*, caule abbreviato simpliciusculo; foliis lineari-lanceolatis serratis patulis; capsula erecta; operculo plano. *Fl. Brit. p. 1340. Musc. Hib. p. 108.*

β. *elongata*; caule subtripollicari; foliis siccitate crispatis.

This singular variety, extremely different in habit from the common appearance of *B. pomiformis*, was sent me by Mr. Winch of Newcastle, whose ardour and acuteness have already added several plants to the British Flora, and who explores the botany of that mountainous district with unwearied activity. It was gathered by him on rocks at Shewing-Shields, and by Mr. John Thornhill at Edmondbyers in the county of Durham. Both Mr. Winch and I had considered it a distinct species, and I had intended to describe it as such in the present paper; but upon investigation the form of the leaves so exactly coincided with those of *B. pomiformis*, that from this circumstance, and the specimens being destitute of an operculum, I dared do no more than make it a variety, and leave to the observations of future botanists whether it ought to remain so, or to be considered a different individual; which latter I cannot but consider as most probable. In the length of the shoots it equals *B. crispa*, and the leaves have a strong tendency to curl when dry.

7. *B. crispa*, caule simpliciusculo; foliis setaceis patulis, siccitate crispis; capsula subobliqua; operculo obtuse conico. *Swartz Musc. Suec. p. 73.*

B. hercynica.—*Flörke in Schrad. Journ. ii. p. 171.*

Caules cæspitiosi, nunc bi-tri-pollicares, nunc vix sesqui-
M m 4 unguiculares,

unguiculares, basin versus, ut plurimum, fusco-tomentosi, plerumque simplices; folia dilute viridia, remotiuscula, e basi aliquantulum dilatata vere setacea, nervo valido, obscure viridi percursa, per totam fere longitudinem serrata, rigidula, madore patula, stricta, siccitate crispata et contorta; pedicelli subunguiculares, flavescentes, nitidi, ortu terminales, mox laterales-erecti, caulem paullo superantes; capsulae sphaericae, tantillum obliquatae, juniores virescentes, effusae fusco-lutae, sulcatae; operculum, quod ipse non vidi, est, teste Flörkio, obtuse conicum.

I am not aware that any figure has ever been given of this moss; and I should therefore have been tempted to have offered one in the present paper, had not my friend Mr. Winch lately added it to the British Flora, having found it himself in Healy-Field, and in company with Mr. Richard Waugh in Alendale and Cheviot, so that it may soon be expected to make its appearance in English Botany. Dr. Swartz discovered it in Sweden, and Mr. Flörke in the Hercynian Forest. At first sight it so closely resembles *B. pomiformis*, as not to be distinguishable without difficulty; but when examined the leaves will be found considerably more narrow, as well as of a different form; which circumstance, added to the shortness of the pedicles, the oblique direction of the capsule, and the conical operculum, will always be sufficient to keep them separate. The colour too of the leaves in my specimens is green, not yellowish: the stems of those gathered by Mr. Winch do not exceed nine lines in height, while those I have received from Dr. Swartz rise to three inches: but I can find no other difference between them.

8. *B. squarrosa*, caule simpliciusculo; foliis oblongo-subulatis squarrosis integerrimis sub-enervibus; capsula erecta. *Tab. 11. f. 2.*

Caules sub-bipollicares, erecti, plerumque simplices, rarius
vage

vage semel atque iterum divisi, inferne fusco tomento obsiti; folia approximata, infima ferruginea, summa lutescentia, nitida, e basi oblonga vaginante longe subulata, setacea, siccate æque atque madore undique patentia, ut faciem plantæ omnino squarrosam præbeant, nervo lato, tenui, obscuro, citissime evanescente ad basin notata, margine, ni fallor, integerrima, quanquam sub lente acerrima quædam scabriuscula et quasi serrulata viderim; pedicelli in exemplaribus nostris semper terminales, sub-unguiculares, dilute purpurei, læves; capsulæ erectæ sphaericæ, fuscescentes, sulcatæ; operculum non vidi.

Mr. Dickson was so obliging as to communicate to me this new species of *Bartramia*, which he received from Java; and specimens gathered by Commerson are in Dr. Smith's Herbarium. In point of the colour of the leaves, and general habit, it bears most affinity to *B. arcuata*, but differs so strikingly, as well from that as from every other individual of the genus previously known, as to remove all necessity of enlarging upon it.

Pedicellis caule brevioribus.

9. *B. arcuata*, caule ramoso; foliis lanceolatis serratis striatis recurvo-patulis; pedicellis lateralibus arcuatis; capsulis pendulis. *Dicks. iii. p. 2. t. 7. f. 2. Fl. Brit. p. 1342. Musc. Hib. p. 109.*

Mnium chrysocomum.—*Dicks.*

10. *B. Halleriana*, caule sub-diviso; foliis subulatis serratis erecto-patulis; pedicellis lateralibus erectiusculis; operculo conico. *Hedw. Stirp. Crypt. ii. t. 40. p. 111. Fl. Brit. p. 1339. Musc. Hib. p. 109.*

Besides the ten species here enumerated, I am not aware of any mosses hitherto described likely to belong to the genus *Bartramia*, except indeed the *Mnium tomentosum* of

of Dr. Swartz's Prodrômus, p. 109, of the place to be assigned to which in the system I am ignorant, never having seen a specimen. If it be really a *Bartramia*, it appears from the *description to be different from all those I have mentioned, but to be most nearly allied to my *B. Menziesii*.

Yarmouth,

December 1, 1804.

XXXII. *Observations on the natural Order of the Onagrariæ*†; by A. L. JUSSIEU.

THE natural order of plants named by various authors *Onagræ*, from one of the best known of its genera, and since by Ventenat "*les Epilobiennes*," from another equally common, may perhaps be more properly termed *Onagrariæ*, a name which recalls the idea of that first given to this assemblage of vegetables, and of the organization of the principal genus *Onagra*, which is also that of the other genera, while its termination prevents the botanist's confounding the part with the whole, the genus with the order.*

The *Onagrariæ* are very decidedly characterized by an ovary inclosed within the calyx, and concrete with it; by the petals being inserted at the upper part of the calyx below its divisions, to which they are equal in number; by the stamens having the same insertion, and being in determinate number, either equal to or double that of the petals; by a multilocular fruit, generally filled with several seeds, which are attached to the upper part of each loculament;

* "*Mnium tomentosum*, surculo dichotomo erecto tomentoso; foliis subulatis; capsulis sphericis."

† *Annales du Muséum d'Histoire Nat.* vol. iii. p. 315.

and,

and, lastly, by the want of a perisperm, and the upward direction of the radicle generally longer than the two lobes of the embryo.—This characteristic belongs more particularly to the true *Onagrarieæ*, having a single style, and which may be properly divided into two sections; the one with double the number of stamens to that of the petals, the other having these organs equal in number.

We do not at present propose to make any change in, or addition to, the first section, which is the richest in genera; the second comprises four genera, viz. *Montinia*, *Serpicula*, *Circæa*, and *Ludwigia*. The three last most certainly belong to this order, of which they have all the characters; but *Montinia* requires a re-examination in well preserved specimens to determine whether the deviation in its habit be not a true indication of a difference in its organization also. If this genus should be removed to a different order, its place will be supplied by two others, which cannot any longer be excluded; the first is *Trapa*, which had retained its place, as in the arrangement of the genera in the garden of Trianon, among the monocotyledones, because its embryo appeared to have only one lobe: the sum of its characters, however, and especially its habit, bring it near to the *Onagrarieæ*, and warrant the suspicion of an embryo with two lobes. This latter conjecture, first started by Adanson, and in the *Genera Plantarum*, has been converted into a certainty by the observations of Gærtner, (vol. i. p. 127. t. 26.), who found in the young fruit two monospermous loculaments, the ovula of which were fixed at the upper part; while in the ripe solitary seed, he found an embryo without perisperm, composed of one large lobe occupying the whole cavity, and another very small scale-shaped one inserted at the back of the radicle, lying towards, and partly concealing, the plumule. Hence it is clear that the true seat of *Trapa* is between

Circæa

Circæa and *Ludwigia*, near which it has been already placed by Ventenat, in his *Tableau du règne végétal*, a work rich in excellent observations relative to natural affinities.

The other genus, added likewise by Ventenat to this order, is the *Lopezia* of Cavanilles. This plant has the habit of *Circæa*, with which it also agrees in other points; but the two authors differ from each other in regard to the denomination of the parts of the flowers. Cavanilles describes a four-cleft calyx; five petals, three of which are upper* and straight; two lower and elbowed in the middle; a single stamen placed between the two lower petals, and embracing the base of the style with the lower part of its filament. Ventenat, leaving to the three upper petals their original name, considers the two lower ones, which are differently constructed, as two abortive stamens, whence he describes the parts contained in the four-cleft calyx, as three petals on one side of the flower, and three stamens on the opposite side.—A third way of considering these parts appears more natural to me, and more in conformity with the general organization of the order, which constantly shows petals in equal number with the divisions of the calyx, and alternate with them. Thus, as *Lopezia* is furnished with a quadrifid calyx, it should also have four petals, which name therefore should be given both to the two lower geniculated red parts, and to the two upper ones of the same colour. The third intermediate upper petal-like part, of a white colour, which stands more inwards than the others, embracing at its base one side of the style, (while the filament of the stamen, equally of a white colour, embraces it at the opposite side,) may be looked upon as

* The parts of the flower of *Lopezia*, described as "upper" with regard to their position, should rather be called "lower," and vice versa, as may be clearly seen in the living plant. See a very complete description of this flower by the late Mr. Curtis, in the Botanical Magazine, No. 254.—TRANSL.

a second but abortive stamen. Hence *Lopezia* may be considered as a genus with four petals and two stamens, which is less repugnant than the disagreement in the number of parts as described by Cavanilles, and than their unusual respective disposition, according to the explanation of Ventenat. The only remarkable difference subsisting between *Lopezia* and the other genera of the same section is, that in the latter the stamens and petals are equal in number, while the former affords the only instance of the petals being double the number of the stamens.

We had added to the two sections of Onagrarieæ, as established before, two other small series of plants, to one of which, having the habit and many of the characters of the Myrtææ, and only differing from them by the definite number of their stamens, was given the name of *Myrtoideæ*, an assemblage which, without changing its present place in the general series, may possibly in future be found to form a distinct intermediate order, especially if the number of genera it comprehends should receive any addition. To this series is to be referred that ornamental shrub *Fuchsia*, as also the genus *Scutula* of Loureiro, *Memecylon*, *Sirium*, *Santalum*, &c. On the other hand are to be separated from it *Escallonia*, which has nearer affinity to the Ericæ; *Mouriria* of Aublet (*Petaloma* of Swartz), which, according to Richard, comes nearer to the Melastomæ; *Borckea*, the seeds of which Gærtner describes as having a fleshy perisperm, not to be met with in the Myrtoideæ, and perhaps also *Jambolifera*, the character of which is differently given by different authors*.

The other series, more distant from the Myrti, is distinct from the true Onagrarieæ by the plurality of styles, a character that brings them closer to the order of the Ficoideæ. It originally comprised the *Mocanera* or *Visnea* of the younger

* See what has been said of that genus by Mr. Dryander in the Transactions of the Linnean Society, vol. ii. p. 232.—TRANSL.

Linnaeus, *Vahlia* of Thunberg, and *Cercodia* of Solander, or *Haloragis* of Forster. At the time when that arrangement was made, we were unacquainted with *Mocanera*, except through an insufficient description; and without the assistance of Vahl* we should not have had an idea of applying this name to a shrub from the Canary Islands, found in our herbariums under that of *Royena*, of which it has completely the habit, and also marked as such, in his collection of Teneriffe plants, by the gardener Riedlé: this genus should therefore be separated from the Onagrariæ, and, after being reformed in some points, obtain a place among the Guajacanæ. As for *Vahlia*, this plant does not exist in our herbariums, in a state sufficiently perfect to fix its true place in the series of natural orders: its habit removes it from the Onagrariæ, though the character, as we find it described, coincide with it.

Cercodia keeps perfectly the midway between the Onagrariæ and Ficoideæ, presenting characters common to both, viz. a calyx concrete with the ovary, and bearing at its top the stamens and petals. To the former of these orders it approaches by its habit, and having double the number of stamens as of petals; to the latter by the plurality of styles, and the presence of a fleshy perisperm, as observed by Gærtner (vol. i. p. 164. t. 32.), according to whom, however, its seed is covered by a single membrane, instead of two, as in the generality of seeds; which suggests the idea that its perisperm may be considered only as the inner membrane thicker than usual. After all, this kind of perisperm, whatever be its nature, may determine the existence of a

* In a supplement to this paper by the same author (Annales du Muséum, vol. iii. p. 473.), we are informed that what is here ascribed to Professor Vahl is an observation of M. Ventenat, who had examined *Mocanera* in Cels's garden, where it was raised from seeds sent under that name from Teneriffe. Ventenat has likewise pointed it out to M. Bory-Saint-Vincent, who has afterwards described and figured it in his work on the Fortunate Islands, p. 327. t. 7.—TRANSL.

new order, intermediate between the two pointed out, and to be characterized by this peculiar structure of the seed, by the situation of the ovary within the calyx, by the plurality of the styles, and the definite number of the stamens.

There is another genus which, both by its habit and character, comes near to *Cercodia*, and cannot properly be separated from it; namely *Proserpinaca*, which, probably from being considered as monocotyledonous, had been placed, in the *Ordines naturales* of Linnæus, next to *Potamogeton*, in the families of Adanson and Bernard de Jussieu, after *Hydrocharis*. I myself, not at that time knowing the plant, had left it in the natural order of *Hydrocharides*, but not without expressing my uncertainty with regard to the number of its cotyledons. Gærtner, who (vol. i. p. 115. l. 24.) describes this genus under the name of *Trixis* (given to it by Mitchell, and also preserved by Adanson), has found in the centre of its fleshy perisperm a cylindrical embryo furnished with a long radicle and two smaller cotyledons: if, to these characters, we add an ovary concrete with the calyx, three stamens inserted at the rim of the calyx below its divisions, to which they are equal in number, three stigmas without a style, a nut with an aperture above and containing three monospermous loculaments,—we soon discover the affinity that subsists between this genus and *Cercodia*, from which latter it differs merely by its stamens being equal in number, not double to the divisions of the calyx, by the loculaments of its fruit being reduced to three, and particularly by the want of petals. This latter circumstance does not militate against its near affinity to these genera, since in *Tetragonia* arranged with the *Ficoideæ*, and in *Ludwigia* among the *Onagrariæ*, there are likewise species destitute of petals. As for the perisperm of which Gærtner speaks, who also describes the seed as having but one integument, it is of the same nature as that in *Cercodia*. There is however mentioned by this

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author

author another character of *Trixis*, that presents a striking difference, viz. the insertion of the seed at the bottom of the loculament, while that of *Cercodia* is fixed to the upper part of the cavity of the fruit,—a difference that would have been sufficient to separate these two kindred genera,—but Richard has removed this difficulty, by communicating to us the dissection which he has made of the flowers and fruit, and which he has given us leave to have engraved from his drawing*. It shows the insertion, number, and form of the parts; the seed fixed to the upper part of the loculament, and the radicle directed upwards as in *Cercodia*; which latter, according to Richard's observation, is one of the principal characters of this small series of plants. The embryo here also appears shorter than we see it in Gærtner's work, and hence more resembling the first-mentioned genus†.

A third genus, now better understood, is to be added to the preceding ones, namely, *Myriophyllum*, hitherto ranked among those plants the germination of which is intermediate between the acotyledones and monocotyledones, and which we have arranged with the *Najades*,—though not without observing that, if its embryo should be dicotyledonous, and its ovary concrete with the calyx, it should be referred to the order of the *Onagrarizæ*. This doubt respecting the two characters has been removed by Gærtner, who (vol. i. p. 331. t. 58.) describes of *Myrioph. spicatum* both the male and female flowers, as being sometimes without at other times with petals, but never having more than two; Vaillant, Haller, and others, had observed four; but this

* M. Richard's figures being more magnified than necessary, we have given them on a reduced scale, to make room for others.—TRANSL.

† I was long ago satisfied that in *Trixis* the seed is fixed above; for, having an opportunity of comparing a fruit-bearing specimen of that plant with Gærtner's figure, I found that in the latter the drupe, and consequently its contents, were represented upside down: a very pardonable error, as the conniving laciniz of the calyx are so very minute.—TRANSL.

difference perhaps is of the same nature as that found in its fruit, which sometimes has two, at others four seeds. Richard, who has likewise examined this genus, found four petals in the male flower of *M. verticillatum*, but none in the female. Desfontaines has seen the same; all which proves the uncertainty of the observations respecting the existence and number of the petals*. Richard has also seen with Gærtner, eight stamens inserted at the top of the four-cleft calyx, four sessile stigmas, a concrete ovary, a fruit with four monospermous loculaments, seeds fixed at the upper part of each, and a dicotyledonous embryo with short lobes, and a long superior radicle. He also admits a perisperm like that of the preceding genera, in which he differs something from Gærtner, who speaks only of an inner and thicker membrane. The figure of Richard appearing more complete and accurate than that of Gærtner, we give it here with his leave, and are of opinion that it will confirm the affinity subsisting between this genus and those of *Cercodia* and *Proserpinaca*, between which it may even serve as a connecting link, its male flower with its petals much resembling that of the former, and its female flower, destitute of corolla, approaching in this regard to the latter.

On comparing the organization of those three genera with that of *Trapa* mentioned before, and of *Gaura*, described by Gærtner (vol. ii. p. 205. t. 127.), there will be found a great affinity between them, notwithstanding the absence of the perisperm and the presence of petals in the two latter; and it may be fairly concluded that the two genera thus brought near to *Cercodia*, must also be nearly related to the Onagrarice.

* In *Myriophyllum spicatum* the petals of the female flower are a good deal smaller than those of the male, often so very small that they seem to be wanting; which indeed may be sometimes the case. Compare English Botany of Dr. Smith, who has observed petals in the flowers of either sex, both in *M. spicatum* and *verticillatum*.—TRANSL.

There still remain to be examined living specimens, 1. of the genus *Ammannia*, several species of which, resembling some of the *Onagrariæ* in habit, must be undoubtedly referred to this order, if the ovary should be found concrete with the calyx; 2. of *Najas*, which has likewise a similar habit, but whose embryo has not yet been sufficiently examined; 3. of *Callitriche*, which, represented by Gærtner (vol. i. p. 330. t. 68.) as dicotyledonous, appears to have great affinity with the preceding plants, by means of an organization resembling theirs in several respects.

Another plant that should be subjected to re-examination is *Hippuris*, which, with *Myriophyllum*, has always been ranked with the aquatic plants intermediate between the monocotyledones and dicotyledones. Its flowers, placed in the axils of its verticillated leaves, are either hermaphrodite or female; their calyx, concrete with the ovary, forms, at the top, a small and nearly entire border, in the inside of which is seen a single stamen with a simple style; the ovary becomes a monospermous fruit, crowned with the persistent border of the calyx. Gærtner adds, that the cylindrical embryo, whose radicle is directed downwards, is surrounded by a fleshy perisperm; but he does not tell us whether it be entire, or divided into two lobes. Richard, in his manuscript observations, completes and rectifies those of Gærtner, and clearly shows in his drawing the situation and-form of the different parts. According to him, the seed is fixed to the top of the loculament, exactly as in the other genera examined by us; the embryo, equally cylindrical, is surrounded, not by a perisperm, but by a rather fleshy membrane; its radicle is directed upward, and its base divided into two small lobes*. Are we allowed to conclude from this that there is an analogy between *Hippuris* and the true *Onagrariæ*, which have but one style, though this

* We have added to M. Richard's figure of *Hippuris vulgaris*, that of the fruit of *H. tetraphylla*, which confirms the correctness of the former.—Ta

genus has an unilocular monospermous fruit, and is destitute of petals and a divided calyx? Or has it a more marked affinity with the order of the *Elæagni*, equally apetalous, with fruit concrete with the calyx, and containing a single seed, whose dicotyledonous embryo is without perisperm? Before we are enabled to decide upon this latter question, we must submit the *Elæagni* to a new examination, separate from them a whole section which may form a distinct order, and detach from the other section such genera as from the presence of a perisperm, or other considerations, may more properly be referred to another place in the natural series.

The supplement of Jussieu, mentioned above in our note, contains the following addition:—Another genus should be added to the order of the *Onagrarieæ*, viz. *Isnardia*, which, on the supposition of its having a superior calyx, has hitherto been arranged with the *Salicarieæ*. A more minute examination, confirmed by the observations of Dupetit-Thouars, proves it to have a tubular, four-cleft calyx, perfectly concrete with the ovary; it is without a corolla, and bears, at the top of its tube, four stamina placed round a simple style with a single stigma; its divisions crown the fruit, which is a quadrilocular polyspermous capsule. This character perfectly agrees with that of such species of *Ludwigia* as are without petals, and more particularly of *L. nitida* (Michaux Fl. Amer. 1. p. 87.), which is perhaps *L. apetalu* of Walter, and *L. repens* of Swartz. On examining and comparing these two plants, one is forced to believe them not only congeners, but even two individuals of the same species, with leaves rather more elongated in *Ludwigia*, and rounder in *Isnardia*. The latter genus may, therefore, either be suppressed, and united with *Ludwigia*,

or, what appears still better, be retained, and all such species of *Ludwigia* referred to it as are without petals: the want of corolla, which is a character sufficiently important, does not here take place as an exception in one species, but is found in several of them, which hence may well form a distinct genus, such as *L. microcarpa* Mich. Fl. Amer. 1. p. 88.; or *L. glandulosa* Walt. Carol. 88.; *L. mollis* Mich. Americ. p. 90.; and, perhaps, *L. trifolia* Burm. Ind. 37. In this latter, according to Burmann, as well as in *L. nitida*, the leaves are opposite, while they are alternate in the two others, that differ a little in habit, and appear to be intermediate between the two genera. *Ludwigia microcarpa*, at the first aspect, shows some resemblance to the small species of *Salicaria*; and this exterior conformity exists likewise between other *Ludwigia* and the genera of the natural order of the *Salicariæ*: which proves the affinity of this order to that of the *Onagrariæ*, from which it is only distinguished by the not adhering calyx.

Explanation of Plate XII.

- I. The flower and fruit of *Proserpinaca* highly magnified.
 1. The whole flower; 2. the same with the limb of the calyx opened to show the three stamens and styles; 3. transversal section of the fruit; 4. a perpendicular section of the same, to show the insertion of the seeds; 5. horizontal section of the seed; 6. perpendicular section of the same, to show the whole embryo; 7. the embryo detached.
- II. Organs of fructification of *Myriophyllum verticillatum*, highly magnified.
 1. Male flower with petals and stamens; 2. the same deprived of petals and stamens, to show their insertion; 3. female flower without petals,



rosopumaca



Myriophyllum



IV *Soporia*

V *Goniocarpus micranthus*



aber

petals, with the teeth of the calyx and the stigmas ; 4. transversal section of the fruit ; 5. longitudinal one of the same, to show the insertion of the seeds ; 6. seed detached ; 7. longitudinal, and 8. transversal section of the same, to show the situation of the embryo.

III. Organs of fructification of *Hippuris*, all highly magnified. 1. Flower of *H. vulgaris* ; 2. its stamen separate ; 3. longitudinal section of the ovary ; 4. its fruit ; 5. the same longitudinally, and 6. transversely cut. 7. Longitudinal section of the fruit of *H. tetraphylla*, with withered style and stamen persisting, and showing the insertion of the seed ; 8. horizontal section of the seed ; 9. embryo separated.

IV. The flower of *Lopezia racemosa*.

V. Flower and fruit of *Goniocarpus micranthus*, highly magnified. 1. Flower with petals conniving ; 2. the same opened, showing the situation of the stamens ; 3. the fruit, natural size and magnified ; 4. longitudinal, and 5. transversal section of the same, to show the situation of the seed.

VI. *Goniocarpus scaber*. 1. Two small branches, the one flower-bearing, natural size ; 2. the closed flower magnified ; 3. the same expanded ; 4. the same deprived of its petals and stamens to show the stigmas ; 5. the fruit, natural size and magnified ; 6. longitudinal, and 7. transversal section of the same.

XXXIII. *Some Observations on the preceding Paper, with the Description of two Species of Goniocarpus.*

THOSE botanists who are not altogether unacquainted with natural affinity, will readily agree, that the series of plants placed by Jussieu between the *Ficoideæ* and *Myrti* has received a very valuable addition in the preceding paper of that celebrated author: the whole arrangement seems, indeed, so thoroughly founded in nature, that, whatever change in the subdivisions or separation into distinct orders may be hereafter required, on account of the accession of new genera, none of them will experience a removal to any distant place in the arrangement.

Before I proceed to the description of a genus which I consider as an addition to the *Onagrariæ*, but the character of which has not been hitherto given correctly, I shall offer a few desultory remarks upon some of the divisions of that natural order, such as they are given in the preceding paper, and in the *Genera Plantarum*, beginning with that intermediate between the real *Onagrariæ* and *Myrti*.

The genera *Petaloma*, *Bæckea*, and *Escallonia*, are now very properly separated from this order; one genus is, however, still left there, which in my opinion has much less claim to this situation than any of them, namely, *Ophira*. I shall not now pretend to determine to which order this singular plant should be referred; but certain it is that I could not discover any one character that apologized for its present place; its insertion was most probably owing to its having been confounded with *Grubbia* of Bergius, of which I have not seen the fructification in a perfect state, but which may possibly answer in some respects to the character of the *Onagrariæ*. The inflorescence of *Ophira* is a small ovate ament consisting of a collection of (8—10) very minute ovaries, forming conjointly an oblong body, and furnished

3

each

each with a small calycine border, including four or five connivent hirsute petals, and six or eight stamens. Their stigmas are sessile and still visible on the fruit, which is a sort of drupe of the size of a large pea, containing rarely more than one seed, comparatively large, and formed at the expense of the rest. I shall observe further upon this singular plant at another opportunity.

With regard to *Sirium* and *Santalum*, which are both retained in the preceding paper, it should be observed that they are now justly considered as one and the same genus. (See Coromandel Plants, vol. i.) Linnæus appears to have been misled by the fruit of this plant, on which the border of the calyx is persistent after the laciniae are dropped off; but that these latter are really part of the calyx, and not petals, can easily be seen even in the dry state of the flower. Professor Willdenow has united both genera into one, but has preserved, with the name, the incorrect generic character of *Santalum*, instead of that of *Sirium*, correctly given by Linnæus. It would have been better to have retained the latter name to the genus, and applied *Santalum* as the trivial one.

Fuchsia is an excellent connecting link of this division and that of the true *Onagrariæ*; but a still better one exists in the Banksian herbarium, among the unsettled species of *Epilobium*. This beautiful new genus, a native of California, has the flower of *Fuchsia*, and a fruit exactly like that of *Epilobium*.

Among the division of the true *Onagrariæ* with stamens equal in number to the petals, we find *Serpicula*, which I am of opinion should be arranged with the genera intermediate between the *Ficoideæ* and *Onagrariæ*; an assemblage of plants which, as being closely allied to those two orders, yet offering some very distinct peculiar characters, may perhaps soon be found sufficient to constitute a separate order.

I have not the least doubt but that *Serpicula** of Linnæus, and *Laurembergia* of Bergius, are the same, though the respective descriptions of these two naturalists do not exactly agree in all particulars ; which may be ascribed to the minuteness of the parts of the flower. Linnæus observed the ovarium only in an adult state : hence he does not mention the pistil. Bergius describes the style as simple : but this is most probably erroneous ; for a drawing of that plant in the possession of the Right Hon. Sir Joseph Banks, done several years ago from a living specimen at Kew, by Mr. Francis Bauer, whose accuracy in microscopic researches is sufficiently known, proves the long male flowers, situated above the female ones, to possess very distinct rudiments of *four* blunt styles. It is to be regretted that no dissections of the female flowers are added to this drawing. We are, however, justified in concluding that the same conformation must take place in the female flower ; for it is hardly to be imagined that the perfect ovary should be less complete in regard to number, than the abortive rudiment of that organ.

Its angular fruit, according to the description both of Linnæus and Bergius, is unilocular and of one seed. It must be left to the investigation of future observers to determine if the latter be fixed to the upper part of the pericarp, of which the consideration of the whole structure of the flower scarcely leaves a doubt. Whether in the case of *Serpicula* the four styles indicate an ovary originally of four loculaments, and a fruit becoming unilocular merely by abortion, I shall not now take upon me to decide : it is probable that the number of styles does not of necessity determine a similar number of original divisions of the

* I speak of the only true species of *Serpicula*, which is *repens* : as for *verticillata*, a water plant, constituting a genus of its own, not in any one particular like *Serpicula*, it has crept into this genus by a wonderful error of the younger Linnæus.

ovarium ; which may be instanced, as well as in other plants, in the species of *Goniocarpus* which I am about to describe*.

In the *Genera Plantarum* of Jussieu we find, among the *plantæ incertæ sedis* (or list of plants whose respective places in the series of the natural arrangement were not then ascertained), the genus *Gonocarpus*, established by Thunberg in his “*Nova Genera*” from a plant discovered by him in Japan, the fructification of which is so diminutive that, without the assistance of a microscope at a proper period, it is but too difficult to avoid error. Hence it was that the celebrated author of the *Flora Japonica* describes this plant as having no calyx, but a quadrifid corolla above the ovary, a character which Jussieu adopted, styling, however, *calyx*, what was considered as corolla by Thunberg, and adding the query by no means impertinent “*an Thesio affinis ?*” But a more minute examination of an original specimen in the Banksian herbarium, so liberally opened to the botanist for the promotion of his science, and of a living one that flowered last summer under the fostering hand of Mr. Aiton, has perfectly satisfied me not only of the presence of both calyx and corolla, but also of the place this genus occupies in the net of the natural orders, viz. the same division of the *Onagrariæ* (as they now stand) to which I have referred *Serpicula*.

The number of stamens in that division is of no particular moment ; and indeed I have found in the Banksian herbarium, amongst the species of *Ludwigia*, a plant which, though being furnished with double the number, namely eight, is indubitably a congener of *Gonocarpus micranthus* Thunb. : I shall here give the descriptions of both the species, premising the essential character derived from them.

* Since the above was written I discovered in the minute ovary of *Goniocarpus scaber* four cells, each containing a pendulous egg, and we may conclude that the same takes place in *G. micranthus*.

GONIOCARPUS*.

Calyx ovario adhærens, limbo 4-partito.—*Petala* quatuor summo calyci inserta.—*Stamina* 4 vel 8.—*Stigmata* 4.—*Nux* unilocularis, angularis.—*Plantæ* herbacæ, *foliis* oppositis.

Genus, ratione habita structuræ specierum in posterum forte reperiendarum tetrandræ octandræve, sive ad quartum quartæ classis Linnæani systematis ordinem (propter *Mygindam*), sive ad quartum octavæ (propter *Haloragum*) relegandum.

G. micranthus foliis ovato-rotundis lævibus. *Thunb. Nova Gen. pag. 55.*—*Flora Japon. p. 5 et 69. t. 15.*

Planta annua.—*Radix* fibrosa, fusca.—*Caulis* basi decumbens, ceterum erectus, palmaris, spithameus, interdum pedalis, quadrangulati-sulcatus, totus glaber aut pilis rarissimis oculi nudi aciem fugientibus vestitus.—*Folia* opposita, pollicem plerumque distantia, rotundato-ovata, magnitudine illorum *Anagallidis* tenellæ, tenuia, utrinque lævia, læte viridia, margine obsolete serrato-submembranacea, in petiolos breves excurrentia; ad basin spicarum linearia, integra aut subdentata, subsessilia.

Spicæ terminales, fasciculato-ramosæ, haud raro simplices, elongatæ.

Flores minimi nec inelegantes, subsecundi, brevissime pedunculati, nutantes, rubent.

Calyx ovario adhærens, viridis, quadridentatus: dentes minuti, superi, persistentes, erecti, acuminati, apice rubent.—*Petala* quatuor summo calycis tubo inserta, dentibus

* Too great a similarity subsisting between *Gonocarpus* of Thunberg and *Conocarpus*, the former name, as being at the same time not quite correctly composed, has been altered by subsequent writers into *Genatocarpus*, which I should have adopted had Thunberg meant to compose his word of γόνυ (knee): but, as he obviously alluded to γωνία (angle), I take the liberty of substituting *Goniocarpus*, which I think is at once distinct in sound, correct, and expressive of the original meaning.

calycinis alterna iisque triplo longiora, ovato-lanceolata, concava, crassiuscula, rosea, primo conniventia, deinde expansa.—*Stamina* numero petalorum quibus opposita et concolora : *filamenta* minutissima brevissima : *antheræ* oblongæ, biloculares.—*Ovarium* magnitudine seminis Papaveris, inverse conicum, octosulcatum, ad calycis dentes constrictum, glabrum : *stylus* vix ullus : *stigmata* quatuor obtusa, pubescentia.

Pericarpium, nucula ovali-turbinata, ovario virgineo triplo major, octosulcata : *cortex* tenuis : *putamen* album, fragile, uniloculare.—*Semen* unicum, oblongum, cui loculamenti pars superior receptaculum. *Perisperma* carnosum *embryonem* fovet inversum, cujus *radicula* cylindrica *cotyledones* longitudine superat.

2. *GONIOCARPUS scaber* foliis lanceolatis inciso-serratis scabris.

Ludwigia octandra foliis oppositis lanceolatis serratis, floribus octandris. MSS. Banks.

Habitat in Chinæ Insula prope Macao intra culta. David Nelson 1780.

Planta annua.—*Caulis* herbaceus, spithameus et ultra, superne ramosus, lateribus convexis tetragonus, pilis albidis ad angulos densioribus adpressis pubescens, aut hispidus, subtortus.—*Folia* opposita, ovato-lanceolata, aut linearia, in petiolum parvum abeuntia, crassiuscula, rigida, scabra, pilis hispidula, inciso-dentata, dentibus marginatis, acuminatis.

Spica composita, ramosa, ramis suboppositis sulcatis.

Flores minuti, erecti, singuli bractea subulata acuta suffulti, sordide flavi.—*Calyx* ovario adhærens, læte viridis, quadripartitus : laciniæ superæ, subpatentes, triangulares, acuminatæ, concaviusculæ, tertiam linæ partem longæ, margine albæ.—*Petala* quatuor, summo calycis tubo inserta, oblonga, obtusa, cucullato-concava, tenuia, calycinis

cinis laciniis subopposita, primo conniventes deinde patentia. *Stamina* octo, quorum quatuor petalis alterna, quatuor eorum cavitatibus excepta: *filamenta* brevissima, ratione magnitudinis partium crassiuscula: *antheræ* lineari-oblongæ petalis parum breviores, biloculares, dehiscentes: *pollen* flavescens.—*Ovarium* ovato-globosum, calyce connatum, octo-sulcatum, angulis crenulatis, fortum ovulis quatuor pendulis: *stylus* vix ullus: *stigmata* quatuor, obtusa.

Pericarpium, nucula ovario conformis sed plus duplo major, calycis laciniis persistentibus coronata, ex cœruleo viridescens, hispidula, octogona, angulis irregulariter crenatis: *cortex* tenuis: *putamen* fragile, uniloculare.—*Semen* unicum, summo loculamenti affixum, ovato-oblongum: *perisperma* carnosum, crassum: *embryo* inversus: *radicula* teres *cotyledonibus* longior.

C. K.

XXXIV. *Description of Amomum exscapum.* By JOHN SIMS, M.D.

THE Scitamineæ (Cannæ of Jussieu) being for the most part natives of tropical countries, this natural order has fallen less under the particular examination of botanists, than those which contain the plants of Europe: and almost every author who has written upon them having distinguished the parts of the flower by different terms, their descriptions are confessedly difficult to understand:—"Non facilis florum distinctio partium, quarum forma plurimum varia diversam induxit authorum sententiam de earundem nomine et usu." *Jussieu*. I flatter myself, therefore, that in giving a figure and description of a new species of *Amomum*, discovered by my friend Professor Afzelius at Sierra Leone, and raised, from seeds brought over by him,

in the stove of Mr. Loddiges at Hackney, where it flowered in June last, I shall execute an acceptable task.

AMOMUM exscapum; floribus aggregatis radicalibus exscapis, caule simplici tereti strictissimo, foliis distantibus ovato-acuminatis.

DESCRIPTIO. *Radix* repens subtuberosa.—*Caules* steriles tripedales, basi tumidiusculi, strictissimi, glabri, politissime teretes, calamoidei, fusco-rubri, ex petiolis membranaceis vaginantibus sese tam arcte involventibus ut omnem explicationem recusent, penitus conflati. *Folia* distantia, alterna, ovato-acuminata, glabra, integerrima. *Inflorescentia* radicalis scapo nullo vel brevissimo et intra spatham latitante. *Flores* aggregati. *Spatha communis* bivalvis valvulis carnosissimis rubicundis inæqualibus: interiore majore. Intra hanc sunt membranæ scariosæ, difformes, flores distinguentes. *Spatha propria* 1-valvis, inflata, striata, subdiaphana, latere superne dehiscens, apice obsoleta, ovario concreta, persistens et cum fructu augescens.—*Corolla* 1-petala, tubulosa, irregularis, resupinata: tubus longitudine spathæ cylindricus: limbus 4-partitus: laciniae 3 externæ ovato-lanceolatae, concavae, erectae, striatae, subdiaphanae, dilute carnea, quarum duas angustiores *alas*, alteram latiore genitalia tegentem, *labium superius* dicas: lacinia interior (nectarium Linnæi) maxima, medio viridescens, margine nivea, nitidissime undulato-plicata. *Stamen* 1: Filamentum complanatum, ori tubi insertum, basi biappendiculatum, appendicibus subulatis, apice 4-dentatum, dentibus 2 longioribus patentibus cornuformibus: 2 terminalibus minimis erectis. *Anthera* adnata, oblonga, sulco longitudinali per quem stylus transit in lobos 2 distinctos divisa. *Pistillum*: ovarium minimum, triloculare, ovulis plurimis globosis: stylus filamentum æquans, basi cinctus glandulis duabus oblongis flavescentibus ovarium coronantibus, superne

per antheram transit. Stigma infundibuliforme 2 villosum.—*Pericarpium* ex specimine ab Afzelio ipso *Amomum* IV^{um} signato et in Herbario Banksiano asservato, maximum pro ratione ovarii, trigonum, trivalve. *Semina* subrotunda, plurima.

Obs. Flos cito marcescit siccatus grate aromaticus fit, sed vivus, nisi sole meridiano expositus, vix odor.

Explic. fig. tab. xiii. 1. Inflorescentia. a. Spatha communis. b. Membranæ scariosæ flores distinguentes. c, c. Lacinia externæ angustiores sive alæ. d. Lacinia externa major, sive labium superius. e. Lacinia interna maxima, labium inferius corollæ sive nectarium. 2, 2. Caulis sterilis. 3. Spatha propria. 4. Stamen a fronte visum, exciso nectario, ut pateat illius ex tubo floris ortus et styli transitus : a. Tubus. b, b. Filamenti appendices. c, c. Dentes cornuformes. d. Dentes terminales. e. Anthera stylum amplexans. f. Stigma. 5. Idem a tergo visum a, b, c, d, ut in fig. 4. g. Pars nectarii. 6. Pistillum : h. Ovarium. i. Glandulæ styli basin cingentes.

For the better understanding the different descriptions, it may be necessary to observe that Professor Swartz considers the corolla as having three lacinia, and the nectarium as bilabiate ; making what other authors call the filament the Labium inferius nectarii, to which the anther is attached without filaments, and the nectarium of Linnæus the Labium superius. But according to my ideas of the corolla being resupinate, what he calls inferius will of course become superius, and vice versâ.

XXXV. *Some further Account of the Abacá, from the French MS. transmitted to DAVID LANCE, Esq. from Manilla, and communicated by the Right Honourable Sir JOSEPH BANKS.*

In addition to the paper on the Abacá (*Musa textilis*) in our last number (vide p. 200.), we have been favoured with the following communication by the President of the Royal Society.

To prepare the thread of the Abacá, which is a wild Plantain, it is necessary to observe the period at which the plant is of a proper growth and age to cut, which is known by its beginning to push out small leaves from the centre, or by its ceasing to shoot altogether, which is a sign that the fructification is going to appear; before which the plant should be cut down, otherwise the fibres will be weak and brittle. The Abacá comes to perfection in about two or three years, though it may be cut earlier; but then the quantity of threads will be smaller, and these will neither be so long nor have the same strength as when the plant has acquired its proper growth. To add to its vigour, nothing is necessary but to remove all the young shoots; which may be planted elsewhere; but if these are not removed they will be fit to cut a year after the parent stem.

After the plant has been cut down, all the leaves that envelope the stem to the heart are to be taken off, and the inner membrane peeled off; the leaf is then to be divided lengthwise into three, four, or five breadths: if it be wished to make it pass easier under the scraper, or if it be preferred to scrape the leaf whole, in order the easier to hold it from slipping through the hand, the lower end should be first scraped for a sufficient length to allow the ends of the threads to be tied round a piece of stick, which may serve as a handle to assist in drawing the leaf through
the

the scraper. After the leaves are separated from the trunk, they may be left for two or three days in the shade before they are scraped, and are the better for being so left one day.

The operation of separating the threads from the leaf consists in passing it several times under the scraper, which ought to be rather heavy, till all the pulp with which the threads are surrounded is squeezed out. This is known to be the case when upon shaking the bundle the threads easily separate from one another. These are then fit to be made into cordage and cables, being previously dried in the shade to preserve the cordage the better, especially if the threads have been moistened with fresh water; which is not good for this cordage.

The scraper is a very rude machine, which might easily be improved. Two stakes are fixed firmly in the ground, and to the top of these is adjusted a board; upon this a log of wood is fixed at one end by a peg, while the other end rests in a fork; to this end is attached a cord which passes through a pulley, and is then fastened to the end of a piece of bamboo; by treading on which the operator lifts up the log or lets it down at his pleasure. About the middle of the log is fixed a blade of iron, serving for the scraper, which rises very little above the wood, lest it should cut the fibres.

R E V I E W.

XXXVI. *Flora Boreali-Americana, sistens Characteres Plantarum quas in America septentrionali collegit et detexit, ANDREAS MICHAUX, &c. &c.* 2 vol. 8vo. tab. æn. 51. ornata. Paris 1803.

THE well known author of this work resided twelve years in North America, during which time, at the utmost hazard of his life, and with almost incredible labour and perseverance, he made repeated journies to the back mountains, and from South Carolina to the shores of Hudson's Bay, for the purpose of collecting the vegetable productions of those extensive countries. For some account of these, and others of his labours in the science, we refer to the memoirs of his life, published in the present volume of the *Annals of Botany*.

The insatiable thirst of this indefatigable collector for detecting new plants hurrying him again from home, before he had time to put a finishing hand to this work, his loose papers were intrusted to Michaux the son, who, although from his own account but little versed in botany, has apparently executed his task with fidelity and considerable judgment.

Our opinion of this *Flora* corresponds with what the editor tells us was that of several of his botanical friends to whom he showed the copy. Whilst all agreed as to its general utility, some thought that the specific characters were in general much too long to be admitted to stand as such without abbreviation. We are nevertheless pleased

that no attempt was made to curtail these superfluities, every day's experience more and more convincing us that there is not a word set down by a real observer but what has its value. For though fewer characters might often be sufficient to determine the identity of a plant when arranged with its congeners in a regular system, yet the additional, perhaps strictly unnecessary, one will, in the examination of an unknown plant, frequently afford the greatest satisfaction where we might otherwise hesitate between two opinions. And though we should allow that, if all the known species of any genus of plants were collected together, upon the careful comparison of the whole, one or more characters, exclusively appropriate to each, might be found which would serve very readily to distinguish the individual from all its congeners, and that in very few words, it ought still to be remembered that, on the acquisition of every new species additional distinguishing marks may become necessary, and the very character which before appeared superfluous may now be of the first consequence. Nor should it be forgotten that, when we search for a plant unknown to us in any system, it is always dubious whether the same may not have been also unknown to the author of the system himself. Thus, should our plant have hairy leaves, and we should find in the system one species distinguished by this circumstance, all its known congeners having smooth leaves, we might still be not very well satisfied of the identity of our plant, from recollecting that perhaps our species was an unknown one, corresponding with the one in the system in this solitary character, but differing perhaps in many others. Whilst, therefore, we are sure that there are many plants not in any system, we shall always feel the more satisfied of the identity, the more points of agreement we discover. It is owing to this daily acquisition of new species unknown to Linnæus, that every botanist feels the frequent insufficiency of the beautiful terse characters of that great master's

master's hand, though perhaps fully adequate to distinguish the plant from all its congeners at that time known to him. We would not, however, be understood to approve of long distinctive characters; these, if sufficient, cannot be too circumscribed: but in this instance, as they contain nothing but real and valuable facts, the curtailing of them would have been to be regretted, unless whatever had been deemed superfluous in a specific distinction had been carefully preserved in the form of observations. This might perhaps in many cases have been done, had the author himself superintended the publication. For it is not very likely that he considered these so much as improved characters, as a compendious mode of recording his observations; and this appears the more probable, as he gives no other descriptions of the species throughout his work, and adds them as well when there is only one known species of a genus, as when there are several; which is surely what no scientific botanist was likely to have done, had he considered them as merely distinguishing characters.

We have more serious objections to the frequent innovation this author has taken the liberty of making in the botanical nomenclature: this disposition, which unhappily is too prevalent amongst the botanists of the continent, cannot be too warmly inveighed against. For although we are very willing to allow that the present names are frequently very bad, yet, as the best possible cannot be given till every individual species be known, whilst our knowledge is so far below this, every change, being necessarily founded upon an unstable basis, and tending certainly to produce confusion, ought to be as much as possible avoided. We say as much as possible, because we are sensible that as the genera become to be more accurately defined, and settled more agreeably to natural affinity, some change of names cannot of course be avoided, as the species must take the name of the genus to which it is

found to belong ; but in this case the trivial name should be sacredly preserved, a rule which has been usually dispensed with by M. Michaux. Should the time ever come when the catalogue of the plants of the known world shall be as complete as that of Europe is at this day, it will then become proper to reform the nomenclature, which before that period cannot be fixed upon a solid foundation, at least whilst framed upon the principles now in use.

These strictures are not intended to arraign the new genera that M. Michaux has thought proper to raise from species before known, although this appears to have been sometimes done upon grounds too trivial to warrant such a change, so much as to condemn the unnecessary alteration of the specific name, and even frequently of that of the genus, without any good reason. But here again we must seek an apology for the author in the unfinished state his papers have been left in. To us it seems highly probable that, in many instances, the author had no intention of changing the nomenclature ; but the established appellation not occurring to him at the time, he applied these as nicknames for the sake of recording his observations, which ought to have been cancelled when the real ones were discovered.

We shall now give a list of the truly useful plates with which this work is illustrated, making such observations as we suppose may be either useful or interesting to our readers. They represent the greatest part of the new genera ; are all engraved from drawings by M. Redouté, taken from the dried specimens, which not easily admitting of a very accurate investigation of the parts of fructification, dissections of these are omitted. The representations appear to be faithful upon the whole, but in one respect they evidently show the effects of haste ; every kind of pubescence, except sometimes upon the stems, is in general omitted.

1. *ELYTHRARIA virgata*.—This is *Justicia squamosa* Soland. MSS.—*Tubiflora carolinensis* Gmel. Syst. Nat. 27. and is a congener of *Justicia acaulis* Sup. Pl.—2. *MICRANTHEMUM orbiculatum*.—*Globifera umbrosa* Gmel. Syst. 32. In habit it much resembles an *Anagallis*.—3. *TRIPTHBELLA capitata*.—A near relative of *Burmannia*.—4. *HERITIERA Gmelini*.—*H. tinctoria* Gmel. Syst. 113. Of the natural order of *Ensatae*, and very nearly allied to *Dilatris* and *Wachendorfia*; totally different from *Heritiera* of Hortus Kewensis.—5. *SEPTANTHUS ovalis*.—*Pontederia limosa* Swartz.—*P. triandra* Banks. Herb.—*Phrynum ovatum* Soland. MSS.—6. *STIPULICIDA setacea*; a congener of which is *Holosteum cordatum* Linn. It receives its name from the incised stipules. The principal difference between this genus and *Holosteum* is, that the latter has three distinct stigmas, which in *Stipulicida* are united at the base into a short style; surely a distinction insufficient to found a new genus upon.—7. *FUIRENA scirpoidea*.—Has the character of *Fuirena*, but a different habit.—8. *TRICHODIUM laxiflorum*.—*Cornucopiæ perennans* Walter.—*Agrostis Cornucopiæ* Smith in Fraseri Monogr. Has no affinity with *Cornucopiæ* Linn. If the characters here given be constant, it appears to be properly made a distinct genus, having, according to the Linnæan terms, a two-valved calyx and one-valved corolla. Receives its name from its capillary inflorescence.—9. *ORYZOPSIS asperifolia*.—Appears to us to have the characters of *Melica*.—10. *FESTUCA ? diandra*.—11. *POA reptans*.—Remarkable for having a creeping stalk, though an annual.—12. *CENTAURELLA paniculata et verna*.—The first appears very like *Chironia paniculata*, and the second *C. alba* in the Banksian Herbarium.—13. *PINCKNEYA pubens*.—A new genus of the same natural order, and very closely allied to *Cinchona*, and said to be applied to the same purposes.—14. *BATSCHIA canescens*.—Hardly distinct from *Lithospermum*, indeed coming very near to *L. officinale*.

This name is already applied to another plant.—15. *ONOSMODIUM molle*.—The generic character differs but little from *Onosma*. *Lithospermum virginianum* is made a congener of this.—16. *PHACELIA bipinnatifida*.—A genus of Jussieu's, nearly allied to *Ellisia*.—17. *PYXIDANTHRA barbulata*.—A new genus, named from the box-like manner in which the cells of the anthers open. Resembles, as the author remarks, *Azalea procumbens* in habit.—18. *STREPTOPUS roseus*.—*Convallaria amplexifolia* is a congener of this genus, which receives its name from the twisted peduncle.—19 and 20. *DIPHYLLEIA cymosa*.—Has much the appearance of a *Podophyllum*.—21. *CAULOPHYLLUM thalictroides*.—*Leontice thalictroides* Linn. Undoubtedly a distinct genus. The Banksian Herbarium contains another species under *Leontice* that is a congener of this.—22. *ZIGADENUS glaberrimus*. Hardly different from the American species of *Melanthium*: we find the same plant in the Banksian Herbarium under the name of *M. obscurum*.—23. *VACCINIUM hispidulum* L.—*Arbutus thymifolia* Hort. Kew.—We may here observe that Michaux considers *Vac. macrocarpon* of the Hortus Kewensis as a mere variety of *V. oxycoccos*, remarking that in several parts of America he has met with some specimens in every respect like the European, with many intermediate varieties. We have, however, observed a remarkable difference; in all the specimens of *V. macrocarpon* which we have seen, the stalks are prolonged beyond the flowers as in Aiton's figure, whilst in *V. oxycoccos* the peduncles are perfectly terminal; but as of the former we have for the most part seen the cultivated plant only, we cannot determine how far this character may prove constant.—24. *ERIOGONUM tomentosum*.—Enneandrous; has the habit of a *Polygonum*, without the sheathing stipules.—25. *PLEEA tenuifolia*.—Another Enneandrous plant related to *Narthecium* and *Melanthium*. Name we suppose from M. Plee, the botanical

nical engraver.—26. *BEFARIA paniculata*.—*Bejaria racemosa Hort. Cels.*, where M. Ventenat has corrected the error in the name upon the authority of M. Zea, a pupil of Mutis.—27. *DALIBARDA violæoides*.—*Rubus Dalibarda Smith Icon.* 20.—*Dalibarda repens L. Spec. Pl.* Dr. Smith's figure is acknowledged to be a good representation, except that the calyx and petals are said to be too acute: in all other respects his figure would seem superior to this, in which the pubescence is as usual omitted.—28. *DALIBARDA fragarioides*.—29. *HYDROPELTIS purpurea*.—A new genus in the natural order of *Hydrocharides*.—30. *ISANTHUS coeruleus*.—Resembling in habit *Satureja hortensis*.—31. *BRACHYSTEMUM verticillatum*.—Of this *Thymus virginicus* is made a congener, the separation of which from *Thymus* appears to us very proper, as it approaches nearer to *Clinopodium* than to *Thymus*.—32. *BRACHYSTEMUM muticum*.—33. *PYCNANTHEMUM aristatum*.—*Nepeta virginica L.*—*Clinopodium incanum* is also made a congener of this. The last two genera might, we think, have been combined.—34. *PYCNANTHEMUM Monardella*. The author doubts if this species is properly placed under this genus. The figure here given is a pretty exact representation of *Monarda elongata* of *Hortus Kewensis*, before the corollas appear.—35. *CAPRARIA multifida*.—36. *ERYTHRORHIZA rotundifolia*.—*Galax aphylla L. Vide Bot. Mag.* 754. As the synonym of Linnæus is here given, the change of the name appears to have been altogether without reason.—37. *PETALOSTEMON candidum* and *violaceum*.—*Dalea Juss.* This genus has only five stamens; but the author does not unite with this *Dalea* of *Hortus Cliffortianus* (*Psoralea Dalea Sp. Pl.*) as Jussieu has done: the latter still retains the name of *Dalea*, and is figured in the next plate under the name of—38. *DALIA Linnæi*.—39 and 40. *LESPEDEZA procumbens* and *polystachia*.—These two plants were both part of the too extensive genus of *Hedysarum*. The former

is very nearly related to *H. violaceum*, and the latter is *H. hirtum* of Linnæus. *Medicago virginica* L. is referred to the same. M. Michaux has named this genus in honour of M. Lespedez, governor of Florida, who, as far as appears, had no other title to such a distinction than that of having shown civilities to the author. *Heu quorsum evulerit honos!*—41. *ZORNEA tetraphylla*.—Of this genus, adopted from Walter, *Hedysarum diphyllum* L. is a congener.—42. *SPARGANOPHORUS verticillatus*.—43. *PERSOONIA latifolia*.—*Athanasia trinervia* Walt. The name of *Persoonia* is already applied to a totally different genus, a native of New Holland.—44. *PODOSTEMON ceratophyllum*.—A singular little plant allied to *Ruppia*.—45. *PACHYSANDRA procumbens*.—46. *CROTONOPSIS linearis*.—47. *SCHISANDRA coccinea*—seems hardly different from a *Menispermum*.—48. *ADRIA acuminata*.—49. *ILEX? canadensis*.—50. *ACNIDA rusocarpa*.—This genus is nearly allied to *Amaranthus*, and the species here represented has much the same habit.—51. *GYMNOCLADUS canadensis* Lamarck.—*Guilandina dioica* Linn.—*Hyperanthera dioica* Vahl. *Symbol.* 1. p. 30.

Besides those represented in these plates, several other known plants are elevated to the rank of new genera, such as the following, which we think it may be useful to enumerate, to direct the attention of botanists towards them. *Schoenus stellatus*, and similar species of *Schoenus*, are called *Dichromena*. This has a bifid, not a trifid style, the other distinguishing characters are slight.—*Anthoxanthum odoratum* of Walter is called *Erianthus saccharoides*, from the woolly involucre of its flowers. This appears to resemble very much some of the larger species of *Holcus*, and has near affinity to the sugar-cane.—*Dactylis cynosuroides* Linn. is called *Trachynotia* from the rough back of the valves of the calyx.—*D. patens* will likewise be a congener of this.—*Queria canadensis* Linn. is called *Anychia*

chia dichotoma. It seems to have been very proper to separate this from *Queria hispanica*, with which indeed it agrees scarcely in any thing, not even in habit.—*Ipomæa rubra* *L.* is called *Ipomopsis*.—*Hedera quinquefolia* *L.* and *Vitis arborea*, are combined in a new genus called *Ampelopsis*. These terminations in *opsis* will hardly escape the sentence pronounced by the botanical lawgiver against all words ending in *oides*. (*Vide Philos. Botan. p. 161.*)—*Heloniás asphodeloides* *L.* (*vide Bot. Mag. no. 748.*), is separated into a distinct genus, with the name of *Xerophyllum setifolium*, upon grounds hardly sufficient, though the difference in habit is great.—*Podophyllum diphyllum* *L.* having only eight stamens and eight petals, is separated into a genus named *JEFFERSONIA*.—*Annona triloba* *L.* is called *Orchidocarpum abietinum*. To this genus are referred *Annona pygmæa* and *grandiflora* of Bartram.—*Trifolium biflorum* *L.* is referred to *Stylosanthes* of Swartz.—*Bidens nivea* *L.* and *Calea aspera* *Jacq.* form a genus with the name of *Melananthera*, from the black anthers.—*Ulmus polygama* *Reichardi* is *Planera Reichardi*, a name adopted from Walter.

We have a further proof that this work wanted the finishing hand of the author, in the fact that many well known vegetable inhabitants of North America are in vain sought for in its pages. It ought indeed rather to be considered as a collection of materials towards such a work, than as a complete North-American Flora. We cannot, however, close our review of these volumes without bearing our testimony to the utility of the observations with which every page abounds, and recommending them in the strongest manner to the careful perusal of every botanist who shall attempt to describe any of the plants of the United States, or the British possessions in those parts.

XXXVII. D. CAROLI LUDOVICI WILLDENOW, *Bot. et Hist. Nat. Prof.*—*Hortus Berolinensis; sive Icones et Descriptiones Plantarum rariorum vel minus cognitarum quæ in Horto Regio Botanico Berolinensi excoluntur.* Fasciculus I. et II. Berolini 1804. (Price of each Number 4 Thaler 4 Gr.)

It is not much less than two centuries since Basil Besler published an account of the plants of the garden of the bishop of Aichstädt in Franconia, under the title of *Hortus Eystettensis*, in imperial folio; a most sumptuous and magnificent undertaking, and, for the time, executed with wonderful elegance and accuracy. The first artists of the day must have been employed: the figures are as large as life, and better representations of many of the common flowers of the gardens of Europe are scarcely now to be found. The plates not being numbered, references are not readily made, nor the figures sought for easily found, which is probably the principal reason that this work is so seldom quoted in the synonymy of authors. In the years 1697 and 1701 was published, by John and Caspar Commelin, the *Hortus Amstelodamensis*, containing, in two folio volumes, complete descriptions, and a considerable number of remarkably well executed plates, of rare and exotic plants cultivated in the medical garden of Amsterdam: a work that would merit still higher encomiums than have been bestowed on it, had the exactness of the draughtsman in all cases equalled the skill of the engraver. About twenty-eight years after the publication of this work, appeared the *Hortus Elthamensis*, or delineations and descriptions of the rare plants cultivated in the garden of Dr. James Sherard, brother of the famous Dr. Wm. Sherard, at Eltham in Kent, by Dillenius. This is an inestimable work; for if the figures are inferior in elegance to those of the *Hortus Eystettensis*, yet they are far more important, from the botanical accuracy with which they are

are executed, and the rarity of the plants. It was soon followed by the *Hortus Cliffortianus* of Linnæus, which deviated from the before-mentioned works, as deriving its importance and celebrity chiefly from its descriptions, systematic arrangement, and botanical science; the plates, though very neatly executed, being not numerous. From this time the name of *Hortus* became a common title to the enumeration of the plants of almost every botanic garden in Europe. Yet as far as respects representations of plants cultivated in gardens, we do not recollect any others of equal importance to those above mentioned, till the year 1770, when the first volume of the *Hortus Vindobonensis* of Jacquin, by the beauty and accuracy of its drawings, and imitations of the natural colours of the living plant, united to scientific description, and minute dissection of the organs of fructification, formed a new era in botanical *Iconography*. Yet who could believe that posterior to these elegant and accurate volumes, there should appear such a work as the *Hortus Romanus* of Bonelli and Sabbati, continued in ten successive volumes, in imperial folio, containing each a hundred bedaubed delineations, that are in every respect a disgrace to the science? The example of Jacquin has, however, been in a great degree followed in almost every country of Europe; and London and Paris have, in a few instances, even eclipsed Vienna in the elegance of these productions.

Without pretending to vie in splendour with such first-rate performances, many highly useful *Horti* have been published in different countries, the most important of which have been already mentioned in this volume of our *Annals*. In this class is to be ranked the *Hortus Berolinensis*, by Professor Willdenow, of the first and second numbers of which we are about to give an account; and we feel not the less obliged to this excellent naturalist, that, whilst tempted by the magnificent productions of nature which southern America, Africa, and Australasia are daily pouring forth, authors of
Horti

Horti seem striving to outvie one another in the splendid colours and beautiful forms with which they decorate their pages, he has deigned to take particular notice of what some may regard as poor outcasts of the garden ; seeing, with the eye of a true botanist, the same beauty in the humble Hawkweed or Ambrosia, as in the gaudily decked and curiously fashioned corol of a Tiger Flower or Superb Lily. Under such circumstances we might indeed have expected that our author would have bestowed a little more pains in explaining, by more detailed dissections, the internal structure, which it concerns every botanist to know : we feel, however, little disposed to grumble at this deficiency, which may easily be supplied in the succeeding numbers, and shall therefore proceed to lay before our readers an account of each plant that is here figured and described in succession.

Fasc. I.—1. *TRIPSACUM monostachyum*. This fine species differs from *T. dactyloides* by having a solitary terminal spike, while in the latter there is an aggregation of androgynous spikes at the top of the culm. Each male glume contains two flowers, the outer one, according to the author's observation, male, the inner neuter ; but the dissection given in the plate appears to represent the reverse.—2. *FRANSERIA artemisioides*. *Franseria* of Cavanilles is a dioecious genus of the natural order of the *Corymbiferae*, allied both to *Ambrosia* and *Xanthium* ; a former species of the latter, *X. fruticosum* L., is here added to it under the above name. *F. ambrosioides* Cav. differs from this in having ovate-lanceolate leaves, and appendages to the petioles.—3. *FESTUCA unioloides*.—Seeds received from Carolina as a new species of *Uniola* ; having, however, the bivalve calyx of a *Festuca*, it is added to this genus, and characterized thus : *T. panicula contracta, spiculis compressis octofloris muticis, foliorum vaginis apice barbatis*.—4. *PARTHENIUM integrifolium* L. is here properly placed in *Syngenesia Polygam. æqualis* instead of *Monoecia*. The upper surface of the leaves is described as smooth, without mention of the

the white hairs with which, in our gardens, they are thinly beset.—5. *HYPECOUM patens*. This species, a native of Egypt, and not unlike in habit to *procumbens*, is thus distinguished from its congeners : *H. siliquis arcuatis teretibus articulatis, petalis binis majoribus obtuse trilobis*.—6. *AMMANNIA ægyptiaca*, a new apetalous species, akin to *A. latifolia*, from which, however, it is distinct, by having neither a square stem, nor its upper leaves stem-embracing.—7. *AMMANNIA auriculata* W., with the foregoing, a native of Egypt. It appears so very well to agree with *A. coccinea* of Rottboll (which name Linnæus the son, without any obvious reason, altered into *octandra*), that we should not hesitate to pronounce it one and the same, were it not for a difference in the calyx, which is not quadrifid with oblong-lanceolate lacinizæ (as Mr. Willdenow describes that of his plant), but tubulous, four-cornered with eight teeth, four of which are inflected : as for the two other characters given here as distinctive ones, viz. the shape of the leaves, the triflorous peduncles, and the small flowers, they are precisely those of *A. coccinea*, as we are persuaded from the examination of original specimens. The author of the Hort. Berolinensis, in giving this differentia, seems to have had in view the figure of the latter species in the Plants of Coromandel.—8. *WURMBEA bullata*. We are here informed by Prof. Willdenow that he meant this plant in his Species Plantarum by *Helonias bullata*, to which he thinks it bears some distant resemblance. The fact is, that the plant here figured and described is neither *Helonias* nor *Wurmbea*, but *Aletris farinosa* of Linnæus, and, perhaps, the only species properly belonging to that genus. We owe this observation to Mr. Dryander, who directly recognized the plant in the figure of Willdenow, and we have since found it perfectly correct. Michaux has another *Aletris*, to which he applies the synonym of Plukenet and Morison attributed to *Wurmbea bullata*.—9. *PRUNELLA pennsylvanica*. It comes near to *P. vulgaris*, but differs chiefly in being biennial,

nial, in its deeper indented leaves, and the equal laciniae of the calyx.—10. *HIERACIUM nigrescens*, is said to be distinct from *H. humile*, in having all its leaves petioled, and only toothed at the base, larger flower, and blackish calyx covered with hairs. Its locus natalis unknown.—

11. *MOLLIA diffusa*. This is *Polycarpaea Teneriffæ* of Lamarck, a humble plant, of which there exists already an excellent figure in the *Journal d'Histoire Naturelle*, tome ii. Prof. Willdenow has changed Lamarck's name of *Polycarpaea*, as too near in sound to *Polycarpon*, a Linnæan genus, substituting another name, in honour of M. de Moll of Salzburg, and adding as congeners (besides *Polycarpaea spadicea* and *corymbosa*) *Achyranthes stellata* and *tenuifolia* of his edition of the *Species Plantarum*. We observe here that in the latter work *Illecebrum divaricatum* n. 11. should be cancelled, it being the same with *Mollia diffusa*.—12. *AGROSTIS tenuiflora* W. A North American species, first described by the author in his *Species Plantarum*.

Nro. II.—13. *CYPRIPEDIUM pubescens* W. This beautiful plant is likewise a native of North America. Though rather different in habit, it approaches much nearer to *C. Calceolus* than *C. spectabile* of Salisbury; but it is sufficiently distinct from both in the form and size of the upper and under lip. As for the pubescence which Willdenow mentions among the characters that distinguish this species from *C. spectabile*, we can affirm that the same is often found in the latter, provided it be the same plant with *C. album* of the Hortus Kewensis, to which we allude.—*Cypripedium flavescens*, Redouté's *Liliacées*, pl. 20. appears not to be different from Willdenow's *C. pubescens*; but we doubt the correctness of the synonymy added to the former.—14. *SINAPIS integrifolia* a new species from the East Indies, which we saw also flowering last year in the garden of the Right Hon. Charles Greville at Paddington. It is akin to *S. brassicata*, but its leaves are never *auriculata* at the base, always sessile, and doubly pinnated.—15. *HUD-*

SONIA ericoides. We were glad to find a figure of this very handsome plant, an inhabitant of the heaths of North America, and which, for ought we know, has not yet been introduced into our gardens. It is propagated by layers, though not without difficulty. The seeds did not arrive at maturity. It requires a loose soil mixed with sand, and is kept in the hothouse during winter. Professor Willdenow states that the three laciniae of the calyx are sometimes entire, sometimes two or only one of them emarginated; it should however be observed that in the wild specimens only one of the laciniae is entire, the others more or less cleft: a character that in conjunction with others, appears to us to indicate an approximation of this genus to *Cistus*, more than to the *Ericae* of Jussieu.—16. **HIERACIUM laevigatum** W. A new smooth-leaved species, akin to *H. murorum*, *ramosum*, and *sabaudum*. It is characterized thus: *H. caule erecto ramoso, foliis oblongo-lanceolatis glabris petiolatis medio profunde dentatis, floribus paniculatis, basi calycis pedunculisque pubescentibus.* Habitat unknown.—17. **PELARGONIUM canariense** W.: pedunculis subbifloris, foliis tripartitis apice dentatis, floribus pentandris tetrapetalis, caule suffruticoso. A very elegant species, distinguishable from the kindred species, *myrrhifolium*, *lacerum*, &c. by the shape of the leaves, and the number of stamens as expressed in the *differentia specifica*.—18. **CLBOME pungens** W. A native of South America, with quinated viscous leaves, prickly stem, and flesh-coloured flowers. Is liable to produce incomplete flowers with regard to the organs of either sex.—19. **RAPHANUS cheiranthiflorus** W. A non-descript species from Spain, with pods bilocular, smooth; radical leaves lyrate, dentated obtuse, stem-leaves pinnatifid with lanceolate acute laciniae.—20. **SALVIA Forskalii** L. This very beautiful species has not as yet been figured in any work we know of. The tube of the corolla is of a brownish yellow, both the lips are sky-blue, the under with a white blue-spotted disk.

We are probably to have another figure of it in Sibthorp's *Flora Græca* by Dr. Smith.—21. *LEPECHINIA*. The essential character of this new genus of *Didynamia Gymnospermia*, dedicated to the memory of the late Russian academician Lepechin, is, Calyx bilabiatus; corollæ labium superius bifidum, inferius tripartitum laciniis subæqualibus; stamina distantia. It seems to be a distinct genus, for though allied to *Mentha*, it differs in its calyx being bilabiate, the upper lip trifid, the lower bifid, and the laciniæ awned: a character of sufficient importance for the construction of a genus in so natural a family as the *Labiatae*. The habitat of *Lepechinia spicata*, the species here figured and described, is unknown; Prof. Willdenow received the seeds under the name of *Ulericia pyramidata*, by which it is also known in some of the gardens about London.—22. *MESEMBRYANTHEMUM tricolor* W. foliis amplexicaulibus distinctis punctatis lineari-spathulatis subtus convexis superne sulco exaratis, caule brevissimo herbaceo. Hab. ad Cap. b. Spei.—23. *SILENE hirta*. Of this plant Prof. Willdenow received seeds under the name of *S. ciliata*, from which, having compared it with Tournefort's original specimen of the latter plant, he pronounces it different, by having terminal flowers, not so hairy a stem, the calyx not red at the top, nor its laciniæ so densely ciliated. We too have had an opportunity of comparing the figure here given with an original specimen of *Silene ciliata* Tournef. in the Banksian Herbarium, from which it appears that the flowers of this plant, as well as the hairiness of its stem, are subject to variation; nor did we observe the calyx to be red at the top. We are therefore inclined to consider *Silene hirta* W. as a mere variety of Tournefort's species.—24. *VIOLA blanda*. A nondescript elegant species, with white flowers from North America. We recollect to have seen it under the name of *V. pallens* in the garden of Mr. Forster of Hackney, who has cultivated and studied a great number of species of this interesting genus.

MISCELLANEOUS ARTICLES.

ON THE IMPORTANCE OF THE PRINCE OF WALES'S ISLAND FOR THE CULTURE OF SPICE, &c.

By the information of a gentleman lately arrived from Prince of Wales's Island, we are enabled to state to the public the very favourable situation of affairs in the botanical department there*.

Through the unremitting zeal and attention of Mr. Christopher Smith, appointed by the government in India, in the beginning of 1796, to proceed to the eastward, and through the Molucca Islands, for the purpose of collecting the spice plants of various kinds, hitherto natives of those parts only, with instructions to forward such as he should be able to procure to the Prince of Wales's Island, it being thought the most congenial climate for making an experiment in, we are now become masters of every kind of spice plant either valuable or uncommon. The most sanguine

* For this very interesting account of the present importance of the Prince of Wales's Island, and the success of Mr. Christopher Smith in procuring the various spice plants, and cultivating the same, we are indebted to the Right Honourable Sir Joseph Banks.

The early puberty of the spice-trees in India must be a matter of surprise to us, who live in a climate where apple-trees from the kernel remain fourteen years unproductive, and some other trees a much longer time. Dr. Campbell, who has the direction of the East India company's spice gardens in Sumatra, writes in a letter to Sir Joseph, "We have naturalised the nutmeg and the clove to this island. I received the seedling plants in 1798; they had been planted out in boxes in March of that year, and within the period of five years and nine months they perfected their fruit." In March 1804 Dr. Campbell had under his care 22,000 nutmeg-trees, and 6,000 cloves.

expectations could scarcely have looked for such a successful issue from the experiment. Mr. Smith's known character as a botanist, added to his unwearied attention to the duties of his profession, certainly were grounds for hope, when aided by the warm patronage and support of such a character as the present governor of our eastern possessions, Marquis Wellesley, under whose fostering hand every exertion tending to the public good is sure of meeting its reward. We are happy to hear that Mr. Smith, after having had the trouble of collecting, is now appointed sole superintendant of the rearing and bringing to perfection the botanical gardens on the island. The nutmeg and clove trees are in the very highest state of health and perfection for the time they have been there, as is the cinnamon tree. In a very few years we shall not only be able to stock our own markets with all sorts of spice from the Prince of Wales's Island, but also have the opportunity of supplying our neighbours at full as cheap a rate as they can purchase elsewhere. A spice so much in general use as the black pepper, should not be forgotten: the island next year will with ease be able to furnish 2000 tons of that article, equal, if not superior, to any produced either on the coast of Malabar, or on the Island of Sumatra. We do not understand that the company hitherto have purchased any pepper at Prince of Wales's Island, which they certainly now ought to do, otherwise the Americans and other foreigners, who procure it there at a moderate rate, will be able to undersell us in our own markets with the produce of our own settlement.

In many points of view Prince of Wales's Island ought to receive every support, as very few spots in the habitable globe are equal to it. Our correspondent assures us that a medical gentleman at the place told him the following fact, as a proof of the health of the island:—between February 1802 and February 1803, a space of one year, there were

800 men sent into the hospital from various ships arriving there, and convicts from the different settlements, out of which number only the small portion of 16 died; the rest were discharged perfectly recovered.

Timber nowhere grows to greater perfection than on this island: our correspondent says he saw one tree lying on the beach ready prepared as a mast for a ship, it was perfectly straight, without flaw, measuring in length 105 feet. The Indian-rubber plant is very common in the hills, and requires but very little exertion to prevent our seeking for the rubber out of our own possessions. In fine, we are well assured, that were the company to exert themselves, and give proper protection to the island, of which it stands in much need at present, namely, a fort properly situated, they would find it ere long one of their most valuable eastern possessions, and that in very few years it would well compensate for any primary expense they might be at. The harbour is delightful, and being situated in a high road, port duties might be collected there, which would go near paying the expense of building a proper fort for their protection. With respect to the harbour, and advantages that might arise from Prince of Wales's Island, in a maritime point of view, so much has been so justly said by captain Sir Home Popham, that we think it needless to say any thing on that head more, than that if it was so very valuable at the time when he wrote his treatise, how much more so must it be now, when to the advantages stated by him we join that of its having become productive of all sorts of spice plants, and instead of being almost a desert, which it was during his residence there, we see it daily increasing in population and elegance, having now upwards of 20,000 souls settled on it.

In the time of war, should the French ever garrison Batavia, our China fleets would find it much to their advantage to have the Straits of Malacca open to them, which

would always be the case was Prince of Wales's Island put upon a respectable footing ; but should we lose that, the Straits of Malacca and Sunda being then both shut up to us, our trade with China, we much fear, would be attended with too great an expense and risk longer to make it a desirable object.

LIST OF CLOVE, NUTMEG, AND OTHER VALUABLE PLANTS
collected at the Molucca Islands, by Mr. Smith, on account of the Honourable Company and shipped by him on the following vessels, viz.

Ships' names.	Where landed.	Number of Plants.
Eliza	Pinang	2158
Aurora	Ditto	16383
Cartier	Cape of Good Hope, St. Helena, and Kew	1170
Stafford	Pinang	4647
Amboyna	Ditto	27362
Thomas	Ditto	16330
Success Galley	Madras	3773
Rebecca	Ditto	133
Bangalore	Pinang	4809
Ruby	Ditto	4418
Unicorn	Ditto	5122
Swallow	Ditto	1662
Sylph	Ditto	8270
La Imperieuse	Kew Gardens	78
Bangalore	Pinang	3505
Expedition	Ditto	16241
Centurion	Madras	118
Orpheus	Kew Gardens	55
Dover Castle	Kew Gardens	48
Hunter	Calcutta	265
Commerce	Pinang	21031
Princess Charlotte	Kew Gardens	79
Queen Charlotte	Pinang	18501
Total		156518

Abstract

Abstract account of the above plants, viz.

Nutmeg	-	71266
Clove	-	55264
Variety of rare and valuable		29988

N. B. Of the above spice plants there are 8000 nutmeg plants, which I collected at the antient Moluccas, 4000 of which were the royal nutmeg, and it was from those islands that the clove and nutmeg plants were originally introduced to Amboyna and Banda islands.

I also shipped off during my residence at the Moluccas 23 lasts and upwards of Cananie and Gomutie seeds.

(Signed)

C. SMITH.

LETTER FROM MR. HUMBOLDT TO PROF. CAVANILLES.

Whilst we are anxiously expecting that Mr. Humboldt, who has arrived at Paris on his way home, will soon publish some account of his travels, we doubt not but that, in the mean time, the following extract of a letter from this celebrated naturalist to the late Professor Cavanilles, will be read with considerable interest. It has appeared in the 18th number of the *Anales de Ciencias Naturales*, and is dated Mexico, April the 22d, 1803.

After remarking that both M. Bompland and himself had preserved the most vigorous health, notwithstanding the want of shelter and hunger they endured, particularly in passing over the deserts, in a journey across the immense continent of South America, through the countries bordering on the Amazon, to Lima, Mr. Humboldt, so far from confirming what has been said of the enervating effects of these latitudes, supposed to disqualify for every mental exertion, asserts on the contrary that they never found their heads clearer than when contemplating the magnificent scenery which nature displays in those regions. They could

bear, without inconvenience, an exposure for three hours together to the burning sun of Acapulco and Guayaquil, tread the glaciers of the Andes, cross the arid deserts, penetrate the thick woods, and wade through the miry morasses, without feeling their courage fail, or even their spirits in the least depressed.

The travellers left Lima on the 25th of December 1802, stopped two months at Guayaquil, where they had the satisfaction of the company of two distinguished botanists, Tafalla and Manzanilla, in their botanical excursions, and arrived at Acapulco on the 22d of March, after experiencing a dreadful storm off the Gulf of Nicoya.

“ The volcano of Cotopaxi, over which,” says Mr. Humboldt, “ I had passed calmly the preceding year, on the 5th of January made so terrible an explosion, that the noise of it was heard by us, sailing at the distance of six leagues. It vomited forth torrents of flame and showers of ashes, and the snow was detached from its summit ; but it does not appear as yet to have done the smallest mischief, though, not being extinguished, the province of Quito is kept in a continual alarm.

“ You know the ardent enthusiasm of my friend and companion Bompland, and can judge of the botanical riches we must have acquired in passing through a country where no botanist had ever trod before, and where nature delights in producing vegetables so different in form and organization from all that are hitherto known. Our collection exceeds 4,200 species, among which are a great number of new genera, and very many grasses and palms. It contains a hundred species of *Melastoma*, though all those of Linnæus are not found in it. We have described 4,200 plants, and made a great number of drawings from living specimens. We cannot ascertain the actual number of undescript plants till we return to Europe, and have an opportunity of comparing them with those that have been already published ;

published; but we hope to have amassed sufficient materials to form a work worthy the attention of naturalists. Comparative anatomy, as well as botany, has formed a pursuit in addition to the principal object of our journey, and we shall bring home many preparations made by my companion Bompland. I have designed a number of profiles, or geographical charts, with hygrometrical and eudiometrical tables, &c. to determine the physical qualities which have so much influence on vegetable physiology; in such a manner that I can set down in toises the elevation above the sea at which each species of the tropical trees is found.

I am sorry to see what has been written on the Cinchonas, because science never profits by the admixture of personalities with these discussions, and am truly afflicted at the manner in which the venerable Mutis has been treated. The most unfounded notions have been propagated in Europe of this celebrated naturalist, who treated us at Santafé with that frankness which seems the peculiar character of a Banks, communicating without reserve all his possessions in botany, zoology, and physics, and permitting us to take notes of every thing we wished respecting the new genera of the Flora of Santafé. He is now old; but it is astonishing what he has done and is doing for posterity, and we cannot but admire that one man should have conceived and executed such vast designs.

“ M. Lopez showed me his memoir on Cinchona before it was printed, and I pointed out to him that in it was contained evidence that Mutis had discovered the Cinchona in the mountains of Tena in 1772, whereas M. Lopez himself had only seen it near Honda in 1774.

“ With regard to the tree that affords the fine bark of Loxa, having examined it in its native soil, we are of opinion that it has not yet been even described. We have compared it with the Cinchonas which we have seen in the provinces of Santafé, Payau, Peru, and Jaen; in its foliage

it resembles *Cinchona glandulifera* of the Flora Peruviana, but its flowers are different. We have sent to France a collection relative to the Cinchonæ, consisting of fine specimens of the barks, with branches in flower and in fruit, and splendid coloured drawings presented to us by the generous Mutis. To these we have added fossil bones of elephants, found in the Cordilleras, at an elevation of 1400 toises*."

In speaking of that colossal grass called in Santafé *Guaduas*, which produces a siliceous earth similar to that of the bamboo, the writer remarks that this plant forms a new genus very different from *Arundo* of Linnæus, and from *Bambusa* of Schreber. It was not without great difficulty that they discovered the flowers of this plant which the Indians deny ever to bear any, and which even botanists who have observed it for thirty years in countries where it is very abundant, have never seen in blossom. Our travellers, however, were more fortunate, meeting with it in flower in one of the most remote corners of the world, on the Casiquiare, which unites the Orinoko with the Marignon, and afterwards in the valley of Cauca, in the province of Popayau.

DAVALL'S HERBARIUM.

Extracted from a Letter of Mr. W. F. Drake of Norwich to Mr. C. König.

"In answer to your inquiry respecting the late Mr. Davall's herbarium, now added to that of Dr. Smith, I can only say, that if you think the following particulars will be acceptable to the readers of the Annals of Botany, I shall feel myself very happy in being able to afford them.

* We understand that these subjects have been deposited in the national museum at Paris.

This collection of dried plants, weighing eleven cwt., arrived here November 2, 1802, having passed through France during the short interval of peace. Besides Mr. Davall's own, it comprizes the entire Swiss collections of Reynier and Favrod, kept separately and distinctly.—That of Reynier is a regular collection of Swiss plants, arranged according to Haller, very deficient in *Cryptogamia*, but otherwise tolerably complete.—Favrod's is a bulky collection of plants indigenous to Switzerland, generally consisting of old specimens, comprizing many of each species, and classed in natural orders.

Mr. Davall's own herbarium was but imperfectly arranged; the specimens loose (as in the others), but beautifully preserved, in exquisitely neat order, and very rich in rare and beautiful alpine plants; some species extremely numerous. It is not entirely confined to Swiss plants, though chiefly to European ones. Mr. Davall had carefully arranged it after Linnæus, but it is by no means complete, as far as that arrangement goes, as to number of species.

There are besides vast stores of Swiss plants intended to have been placed in the herbarium, and various collections from Villars, Bellardi, Ehrhart, and Dickson, in which are found most of their described plants, as well as other treasures from Mr. Davall's numerous correspondents.

Among the plants was observed an entirely new moss, of the genus *Gymnostomum*, discovered in Switzerland by Mr. Davall, to which Dr. Smith has given the name of *G. Davallianum*. The following specific character he has communicated to me, requesting that it may be inserted in your work.

G. caule brevissimo, foliis lanceolatis acuminatis carinatis patulis, capsula campanulata lævi, operculo hemisphærico."

FROM LETTERS OF DR. ROXBURGH, CALCUTTA, TO
A. B. LAMBERT, ESQ.

Communicated by the latter.

“ April 4, 1804.—If you have specimens of *Millingtonia hortensis* L., call it *Bignonia suberosa*: I have at last got seed-vessels that prove it to be a real Bignonia. I shall give another genus to the late Sir Thomas Millington to make up for that which I am depriving his memory of*.

I have written to Sir Joseph Banks that I have found out an East India Butter-tree. It is a new species of *Bassia*. The butter, or suet, Captain Hardwicke may have shown you. It is his *Phulwara*.

This is the season most trees and shrubs blossom, and I have described and drawn many new things from the Moluccas, Napaul, Hindostan, &c. that have flowered for the first time with me. Among them are a new *Gardenia*, two *Eugenias*, a charming *Commelina* from Captain Hardwicke, with flowers on a scape as in *Ixia*, &c.; two *Rondeletias*, two *Dalbergias*, three or four species of *Rubus*, an *Amyris*, a *Gaertnera*, a beautiful *Erythrina* from Captain Hardwicke; two *Crotalarias*, an *Evolvulus*, a *Cedrela*, the *Epidendrum* of Rumph Amb. vol. vi. t. 50. fig. 1., some *Myristicas*, &c.”

“ June 12.—I have found a second new species of *Pinus*, a native of the mountains of Almorah. The specimens I have got only allow me to say that its branchlets are rigidly

* Dr. König likewise considered that plant as a species of Bignonia. There is, in the Banksian herbarium, a specimen of it sent by him under the name of *Bignonia Azederrachta*, with the following in his own hand-writing:

“ *B. foliis pinnatis decompositis, foliolis integerrimis acutis, corymbis terminalibus longifloris, siliquis linearibus longis.*

Colitur in Hortis, raro siliquam profert. Prope Itheam in sylvis cum fructu reperi.

Flores fragrantissimi. Tamulis Malle-Malligei. EDIT.

erect,

erect, and the leaves in approximated fascicles (40—50 in each) rigid and acute. The male aments, scattered between the fascicles of the leaves, are at first oval, but lengthen much, imbricated with numerous scales, having dilated and incurved tops, and bearing two anthers each. Its vernacular name is Doe Dwar.

I have just finished the description and drawing of the *Butter-tree* mentioned in my last : it will be published in our next volume of the Asiatic Researches, now in the press."

BLIGHT IN WHEAT.

One of the most useful and interesting departments of botany, the pathology of plants, is certainly that which of all is least understood; a circumstance that may, in this case, as well as in many others, be chiefly attributed to our premature attempts to construct systems, before a sufficient number of facts has qualified us for undertaking that task. Whatever may be said on the fallacy of microscopical observations, it cannot be denied that the investigation of vegetable diseases is likely to derive more advantages from them than from any other means : they alone can make us acquainted with the morbid changes the parts of a vegetable have actually undergone, and these found out, the cultivator stands a better chance to discover the remote cause of the disease, which will indicate what measures he ought to take either to cure or to prevent it. It was, perhaps, from some similar consideration that Sir Joseph Banks thought the best means of obtaining some insight into the nature and causes of that baneful disease of wheat, called the *blight*, might be to subject the infected straws to an accurate examination under the compound microscope ; a task which fell to the share of Mr. Bauer of Kew, who has executed it with the greatest possible success. We have had an opportunity of seeing the excellent drawings of that artist, from which it
appears

appears beyond any doubt that insects are not (as is the prevailing opinion of the farmers) the cause of the blight, but that it is a fungus belonging to or near Persoon's division *peridio nullo, sporulis rotundis uniformibus*, which undermines the greatest part of the epidermis of the stalk, and bursts forth at different places in more or less linear, brown, or blackish stripes.—We understand that Sir Joseph intends giving to this important document that publicity which it so greatly deserves.

EXTRAORDINARY GROWTH OF THE BILBERRY.

Mr. Slevogt has communicated in *Voigt's Philosophical Magazine*, some account of a singular change in the bilberry (*Vaccinium Myrtillus* L.). This shrub, he says, growing abundantly in the district of Steinwiesen in Bamberg, towards the Baireuth and Salfeld boundaries, has there so completely changed its nature, with regard to size, that it is found four feet high, and its stem not seldom an inch in diameter; though the soil is of a poor nature, consisting merely of a red ferrugineous loam, mixed with some sand. The utmost height of this shrub hitherto observed is that stated by Burgsdorf in his Manual for Foresters: "On the most rough and elevated mountains it attains its greatest height, viz. two feet."

This *degenerated* shrub has however so exhausted the soil, that the trees there are deprived of the nourishment requisite to their growth, and the saplings never thrive. The bilberry at that place is therefore quite different in its nature from what Mr. Burgsdorf says of it in the above mentioned work: "this little shrub grows abundantly in the shade of lofty trees, but disappears on being deprived of this shelter." On the other hand M. Slevogt knows from experience that it cannot bear cropping, and that, if this operation be repeated a few times, especially in the summer months,

months, it will completely perish, from a subsequent decay taking place in the lower part of the stems.

MEASUREMENT OF OAKS.

The following useful observations on the increase of oak timber in a rich soil and a good climate, made at East Peckham in Kent, by the Rev. Mr. Hill, several years ago, were communicated by the President of the Royal Society.

“From a careful measurement of my oaks at E. Peckham, it appears that they have increased in the following proportion, reckoning a tree under ten feet cubic measure at

From 10 feet to 20	at 0 1 3
From 20 30	0 1 6
Above 40	0 2 0

s. d.	£. s. d.
An oak worth 0 3	has in 9 years been worth 0 0 9
0 6	0 2 0
1 0	0 2 6
1 6	0 5 0
2 0	0 6 0
3 0	0 7 6
4 0	0 8 0
5 0	0 18 0
6 0	0 18 9
9 0	1 7 0
10 0	1 10 0
15 0	1 16 0
20 0	3 0 0
23 0	3 2 0
30 0	5 0 0

Consequently those that nine years since were worth 8*l.* 14*s.* are now worth 19*l.* 3*s.*

N. B. Those above 40 feet have increased in value above six shillings per ann.

And, from the best calculation I can make, I am convinced,

vinced, from an acorn that spontaneously grew in a planted wood of mine, which is a good soil, and has been kept very clean, that an oak in 53 years will increase to 50 feet round measure, and square to above 70 feet; and be fit for the king's dock-yards, where none under 60 feet are admitted."

ON RHUS TOXICODENDRON AND RHUS RADICANS.

M. Van Mons has communicated some very interesting observations on the *Rhus radicans*. It is, according to Bosc, who communicated his observation to the former gentleman, one and the same plant with *Rhus Toxicodendron* L., only in a different state. In a dry soil it is furnished, especially in a very young state of growth, with lobed leaves slightly pubescent; in a moist and shaded soil, on the other hand, its leaves are entire and smooth. It is very common to observe, in a small space, all the different degrees between these two extremes; it is easy to compare them together, and to be persuaded that it is only the station which occasions the abovementioned differences.

Rhus radicans (both the species comprised under this name) is fond of moist woods and the banks of rivers and stagnant waters. Carolina is the part of America where it is most common. When young it creeps along the ground; in this state its leaves are always toothed or gashed and hairy, and it is *Rhus Toxicodendron*; as soon, however, as its stem meets with a tree, it attaches itself to it by means of rootlike appendages, and climbs gradually up, when it becomes *Rhus radicans*. On arriving at this point, that part of it which was before trailing sinks into the ground. This must be the case, as there is never seen any distance between the stem of the plant and the tree on which it climbs. The direction of the stalk is either upright or slanting, or it is subdivided into several branchlets that surround the trunk of the tree; but in each of these cases only the extremity of the straight branches produces those small roots, which annually wither, without however causing the plant

to

to be disengaged from the tree. It reaches the summit of the loftiest trees, and often, in its old state, or in a very favourable soil, will form as it were a wood by its lateral branches. The stems are sometimes four inches in diameter.

The poisonous quality of this plant is very well known to the inhabitants of those regions, and they give it the name of the *poison-oak* *. It is generally believed that the poisonous property of this plant exists in the milky juice only; experience has however taught that its atmosphere produces a similar effect, and even a more pernicious one than that produced by coming into contact with the plant itself. M. Van Marum has been satisfied by a sufficient number of experiments that it is merely a gaseous fluid, issuing from the plant while alive, that produces those baneful effects; and that in a dry, or only withered state, it will never cause any inconvenience whatever. The effects of these effluvia on the human body are different according to the difference in the constitution of those that are exposed to them, and the circumstances under which they operate upon it. It appears as if the inhabitants of those countries where the plant is indigenous, are not liable to suffer by it.

The poisonous perspiration is more particularly found to take place in the shade; when exposed to the rays of the sun, oxygen gas is developed just as in other plants: it is more powerful after a shower of rain, and more at a slow than rapid growth. Bosc states that a drop of the juice of this plant applied to the bare skin, causes an itching, followed by a rising of the epidermis, that is often converted into a dangerous swelling of the part. In Europe the effects appear to be different. The persons most susceptible, on being exposed in the shade to the effluvia for some minutes, perceive a prurigo at the fore-arm and at the neck, which disappears after about two hours. The same persons, on plucking the leaves, or only shaking them from

* In Pennsylvania it is called Poison-Vine.--Ep.

off the trees, get pustules, not unlike scabies, first on the hands, and afterwards on the arms : and when the eruption leaves these parts, it re-appears at the legs, the chest, and sometimes in the face. Its duration is generally from 30 to 50 days, and often it does not make its appearance before the eighth or tenth day after the infection. Sometimes the effects of the poison are confined to the head, which in this case swells very much. In order to prevent the noxious consequences of the poison, nothing is required but to besmear the body with any fat substance, or only to approach the tree while the sun shines.

According to the observations of M. Van Marum, the gaz containing the poisonous substance in a dissolved state, consists of carbonic hydrogen gaz ; the substance itself is a very combustible hydrocarbon, forming a black substance by union with oxygen : it is found both in the stalks and leaves of the plant, which contain a good deal of tanine and gallic acid, a little colouring matter and gummose substance, and scarcely any resin.—Cf. *Tromsdorf's Journ.* and *Römer's Archiv.* vol. iii. p. 182.

DUHAMEL'S TRAITE DES ARBRES ET ARBUSTES.

The new edition of this capital work has been already mentioned in our Retrospect contained in a preceding number. We may now add, that it is printed under the direction of that able botanist M. Brissot-Mirbel, the same that is now entrusted with the superintendance of the gardens and rural establishments at Malmaison. Twenty-two numbers are published, and the next will soon appear.

VAHL'S SPECIES PLANTARUM.

Of this work, for which its celebrated author has long been preparing the materials, the first volume has just made its appearance, comprehending the two first classes of the Linnean system, with the exclusion of the Scitamineæ which
are

are referred to Gynandria. We shall give a detailed account of it in a subsequent number, and here only add the complete title : *M. Vahlîi enumeratio plantarum vel ab aliis vel ab ipso observatarum, cum earum differentiis specificis, synonymis selectis et descriptionibus succinctis.* Vol. i. Havniæ 1804.

✓ DEATH OF ALLIONI.

On the 28th of July 1804, died at Turin, Dr. C. Allioni, professor of botany, director of the botanic garden and museum, &c. in the 79th year of his age, after having for several years been entirely deprived of his sight. Allioni was certainly one of the most respectable botanists that Italy ever had, and would have risen to still greater eminence had not his time been so much occupied by medical practice. In 1750 he undertook a botanical tour through a great part of Savoy, and to the high alps of Piedmont, the first result of which was his *Rariorum Pedemontii stirpium specim. 1^{um}*, containing the descriptions and figures of 30 species of mostly alpine plants. Of this publication he intended giving two additional fasciculi ; but the number of the plants which fell under his examination increasing rapidly, he formed the plan of that capital work the *Flora Pedemontana*, which appeared in the year 1785, in three volumes, folio. The plants described in it (about 2000), are arranged according to a system of his own, first proposed in the *Miscellanea Taurinensia* ; as for the names and the generic characters he follows Linnæus, Haller, and Ludwig. In 1789 he published an *Auctuarium ad Floram Pedemontanam*, in which he describes about 100 additional plants. An earlier work, the joint production of Allioni and his friend Giudice, is *Stirpium littoris et agri Nicæensis historia*, published in 1757, the plants of which are still arranged after the system of Ludwig. For his botanical memoirs see *Dryander's Catalogus Bibliothecæ Banksianæ*, vol. iii.

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Blackburne's

tramia Menziesii

B. squarrosa.

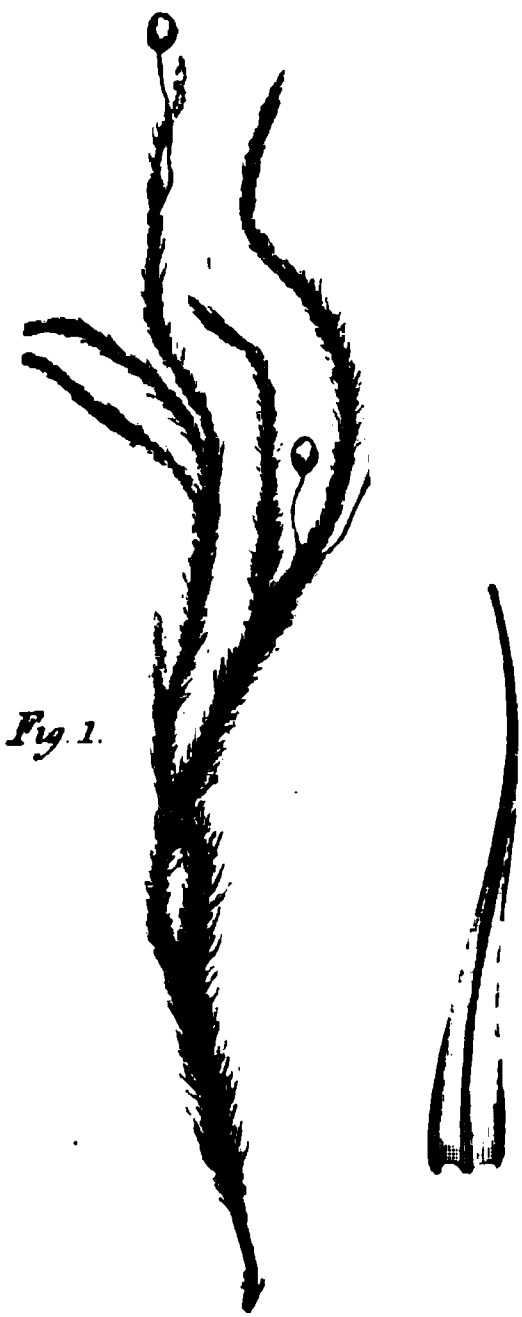
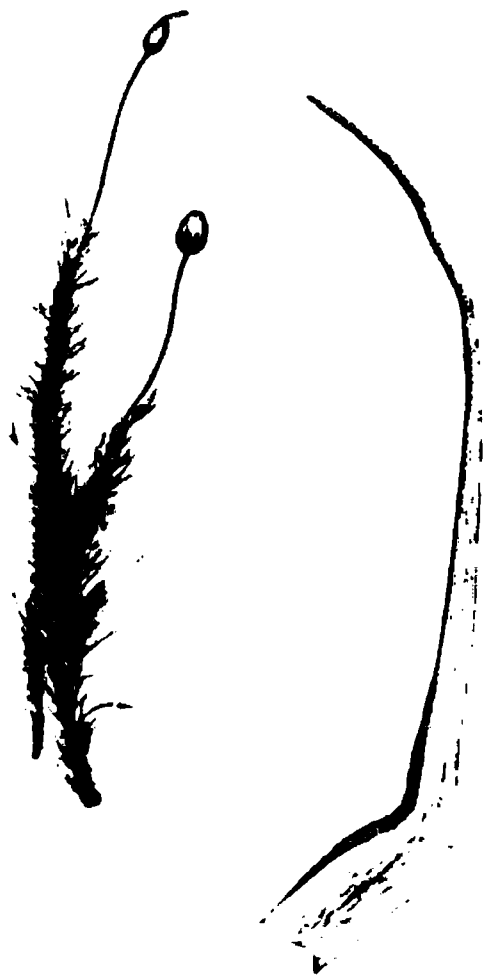


Fig. 2



B. pomiformis



B. crispa

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b

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